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AMERICAN JOURNAL OF OPHTHALMOLOGY

VOLUME 19 FEBRUARY, 1936 NUMBER 2

HEADACHE

From the point of view of the ophthalmologist

WILLIAM H. CRISP, M.D.
DENVER

Headache is a symptom referable to many causes other than ocular. The most important of these are briefly discussed, among others increased intracranial tension, nasal accessory sinuses, gastrointestinal disorders, neurologic causes, fatigue, and allergy. Headache is directly due to eyestrain in a large percentage of cases. The paper does not lend itself to abstracting. Read before the American Academy of Ophthalmology and Otolaryngology, in Cincinnati, on September 17, 1935, as part of a symposium on this subject.

In what may appear to some as the golden age of medical science, is it perhaps somewhat strange that the subject chosen for a symposium should be a mere symptom, arising from a great variety of causes, yet whose precise nature and origin we do not understand? Who can accurately define pain? And who can accurately define headache, except by saying that it is pain in the head?

Pain may be thought of as Nature's warning that the sufferer is in danger from injury or disease. It provokes immediate withdrawal of the damaged or threatened bodily part from the source of danger, or in the case of disease it often serves to compel cessation of physical activity; in other words, to induce rest, which Hilton classically portrayed as the enemy of pain and disease. In functional gastrointestinal disorders it often contributes to the patient's recovery by persuading him to refrain from further ingestion of food.

Headache may occur in plethora, or it may occur in anemia. It may arise from increase of intracranial tension, or it may be provoked by a fall in intracranial tension, as after spinal puncture; although Gordon Holmes (quoted by Critchley and Ferguson[1]) tells us that he has never known migraine to persist in a patient who had had a surgical or traumatic decompression. Headache may arise from excess of food in the gastrointestinal tract, or from an insufficiency. It is a symptom of most fevers, although I doubt whether anyone has ever successfully explained why. To the ophthalmic physician it is significant as a product of eyestrain, yet many patients with plenty of cause for eyestrain proudly allege that they have never had a headache, do not know what headache means.

Opinion as to the exact seat of the pain in headache is almost as indefinite today as in the time of Galen (131-201 A.D.). In 1893, the question was reviewed historically by Harry Campbell[2] of London, who described headache as pain felt anywhere above the base of the skull.

Campbell argued that the aching structure might be "(1) the brain itself; (2) its membranes—the pia mater, arachnoid, and dura mater—these including the tentorium cerebelli, the falx cerebri and cerebelli, and the large fold of pia mater forming the velum interpositum; (3) the skull-bones and mucous membranes lining the frontal, ethmoid, sphenoid, and mastoid sinuses, and the middle ear; and, finally, (4) the structures covering the cranial vault, including the scalp, the skin of the forehead and temples, and all the tissues lying between these and the bone—viz., the pericranium and certain aponeuroses and muscles."

Since it is at best exceptional for a patient to be able to refer his condition to any one of the structures just listed, the patient's testimony as to the seat of the pain is obviously unreliable or useless.

The ancients agreed with modern

medical thought in excluding the brain as a seat of pain. Hippocrates seems to have expressed no definite opinion on the question. Galen's "highly speculative mind" thought the arteries and brain capable of sensibility, but looked upon the meninges and pericranium as the principal seats of headache.

It is interesting to note that Galen distinguishes external headache from internal pain "by the fact that the internal pain spreads to the roots of the eyes (that is the optic nerves), while the external one never does." His explanation of this supposed difference is that the tunics of the eyeballs are continuous with the cerebral meninges, such continuity facilitating transmission of the pain. This view was repeated, almost in Galen's own language, by writers of the sixteenth, seventeenth, and eighteenth centuries. Galen placed the pain in some cases of migraine in the temporal muscles.

Willis (1621-1675), to whom medical science acknowledges a large indebtedness for fundamental knowledge in nervous anatomy and physiology, and who believed that pain depended upon a "convulsion or corrugation of the nerves," declares that the parts affected by the pain of headache are "the two meninges and their various processes, the coats of the nerves, the pericranium . . . and other skinny membranes, the fleshy panicle of the muscle, and, lastly, the skin itself."

Seller (quoted by Campbell) mentions an opinion that the brain is devoid of sensation during health, but capable of becoming sensitive under certain morbid conditions, the sensibility being independent of nerves and altogether *sui generis*. Heberden (1710-1801), in his Commentaries, declares that headache appears to be seated in the brain itself.

Gowers (1845-1915), master neurologist and ophthalmoscopist, made the interesting clinical observation that hemiplegia due to syphilitic thrombosis was very frequently (in one half of his cases) preceded for days or even months by headache, and he remarks that the pain in these cases is "apparently in some way due to the arterial disease itself"; but he does not commit himself to the opinion that it is actually located in the arteries.

As already hinted, the importance of headache for the ophthalmologist lies in the fact that a large proportion of his patients come to him for relief from that particular symptom. Estimates as to the percentage of cases of headache wholly or partly due to eyestrain have varied from 50 to 90 or more. Headache is common even in young children. Many years ago Treichler stated that one third of the children attending school in France and Germany suffered from headache.

Headaches attributed to eyestrain are sometimes due to entirely different causes, and it is equally true that headaches attributed to other factors are often relieved by correction of eyestrain. Thus, eye physicians must be prepared to arrive at a preliminary decision as to whether the headache which the patient describes may be or probably is due to eyestrain; but the eye physician must also know enough about other possible causes of headache to be able to suspect such causes either as acting independently and being responsible for a headache in which eyestrain has no part, or, perhaps more frequently, as conspiring with eyestrain to produce the symptomatic result.

For it must not be forgotten that headache, like some other symptoms, is more likely to occur in the presence of several causes than in the presence of only one cause.

Attempts are often made to decide whether or not we are dealing with an eyestrain headache by its location or by the time of day at which the headache occurs. As very characteristic of eyestrain we include especially frontal and parietal headaches or an ache occurring in and around the eyeball itself. But occipital and nuchal pains are frequently symptoms of eyestrain, and at times eyestrain leads the patient to complain of pain as low down as between the shoulder blades, which of course can hardly be thought of as a headache and yet is closely related to it.

Usually headache is most typically attributable to eyestrain when it comes on during close use of the eyes, or during such distant use of the eyes as in

driving, looking out of a train window, or watching a theatrical performance. A child may develop headache after an hour or two in school and especially during classes which demand close use of the eyes.

If a headache is experienced on rising in the morning, or even during the night, we are a little more apt to be skeptical as to its ocular relationship. Yet many of us have seen patients in whom nocturnal or early morning headache was definitely traceable to strain put upon the eyes during the late hours of the previous day.

The oculist and the otolaryngologist often play a sort of game of "I spy," in which now one scores and now the other. The patient who has been fitted with several pairs of glasses, all pretty much alike, may some day drop in on his oculist with the remark "Dr. Rhino cured my headache right off by washing out my antrum." A week later the oculist may score by giving prompt relief to a patient who has been subjected to nasal packs for a month or so. The great principle of the game, if you play it warily, is to preserve an open mind, and to know a good deal about the other fellow's specialty as well as your own.

Another specialty with which the ophthalmologist needs to have distinctly more than a nodding acquaintance is that of the neurologist. Otherwise he might make the mistake of assuming that an encephalitis developing after German measles was merely an indication for prescribing glasses. It is significant that some of the greatest writers on ophthalmoscopy have been neurologists, and it is a pity that not every ophthalmologist's training has included at least several months in a neurologic clinic or hospital.

The need of at least a year of intimate contact with the practice of general medicine before entering the restricted field of ophthalmology becomes more evident when we remember that the ophthalmologist may be the first physician consulted by a patient who is suffering from nephritis or intracranial tumor or one of the slower forms of meningitis. In a patient who has been under treatment for tuberculosis it is not always easy to arrive at a downright conclusion as to whether headache is due to general toxemia, eyestrain, or a meningeal complication. A patient's cerebral arteriosclerosis may have more—or less—to do with his discomfort than does the inadequacy of his refractive correction.

It is a very essential commonplace to say that we are often called upon to treat the patient rather than his symptoms. Headache may arise purely from general fatigue, although even more frequently from general fatigue in combination with eyestrain. It may not be amiss here to remind nonophthalmologists that excellent vision does not demonstrate freedom from eyestrain, since the worst sufferers from headache often show so-called normal visual acuity without glasses and are relieved by a hyperopic or astigmatic correction which does not materially change their visual power.

Quite commonly we are taught that the myopic or short-sighted patient does not experience headache. There is some truth in this, but also some error. I have found a number of slightly myopic patients whose headaches were relieved upon correction of the myopia. I have no completely satisfactory explanation for this manifestation. In the presence of a low myopia affecting equally both eyes, use of the accommodation can hardly be a factor. But many of these patients resort to contraction of the muscles of the eyelids in the attempt to sharpen distant vision, and this I believe explains the headache or other symptoms of strain which they experience. A myopic patient may of course be subjected to eyestrain if his two eyes are unequal in focus or if the myopia is complicated by appreciable astigmatism.

The refractionist who habitually undercorrects hyperopia needs to be reminded that many headache victims can only obtain relief by patiently learning to wear a full correction, and that the full correction even as found under cycloplegia is most emphatically called for in this type of patient.

Headaches and some more remote symptoms of eyestrain bring us into the interesting field of referred pain. A pa-

tient with uncorrected hyperopia or astigmatism, or with an improper correction, may be subject to frequent attacks of "indigestion"—nausea and even vomiting, often but not always associated with headache. Other referred or reflex symptoms which may occur in association with headache or may occur independently are dizziness, loss of the power of concentration, and various queer head sensations which each patient describes in his own peculiar way.

As Tilley[3] has reminded us, nerve sensations affecting the face and scalp are reflected into the gasserian ganglion and the pons, to be further distributed over an extensive area of brain stem from the level of the corpora quadrigemina to the upper cervical region of the spinal cord; and these nerve impulses find numerous interrelationships with the nuclei of origin of all the other cranial nerves. It must be equally true that nerve impulses from these remote regions are occasionally reflected to the head. The interrelationship between the head and face and the digestive apparatus is particularly intimate, because the sensory root of the fifth nerve lies in close approximation to the root of the vagus nerve in the floor of the fourth ventricle.

Those of our remote ancestors who underwent primitive operations for trephining of the calvarium must have experienced headache as a prominent symptom; yet it is barely mentioned in volumes on the history of medicine.

Headache as a symptom arising from disease of the nasal accessory sinuses is too large a subject to be dealt with in detail here.* In the interpretation of headache, the importance of the nasal sinuses for the ophthalmologist lies in the facts that they may produce headache, that they may even produce a headache which simulates ocular headache, that a headache thought to be due to the sinuses may actually be ocular, and that both the eye and the nasal sinuses may share the responsibility for headache.

When the ophthalmologist has done his best in the correction of a refractive error which seems important, the patient's failure to obtain relief may be due to faulty habits in reading. In many patients excessively rapid reading is productive of cerebral fatigue which may translate itself into general exhaustion and inhibition of digestive function. In children, a sincere attempt to study homework in the evening in spite of distraction by the radio and other disturbances may cause headache and brain fag beside interfering with the intellectual result. On the other hand, steady deliberate work without distractions is not infrequently followed by a sense of restfulness and mental repose. The range or angle at which the book is placed before the eyes, the relative height of the patient and of the table or desk upon which a book is placed or writing is carried on, the question whether study or reading too promptly follows ingestion of a heavy meal, may all have to be considered as supplemental factors.

Headache may arise from irregularities in diet or disorders of digestion. In this connection we may find ourselves confronted with problems relating to chronic gastrointestinal disease, of excessive intake of food, of allergic reaction, or of miscellaneous dietetic indiscretions. The question whether the patient partakes injuriously of alcohol or tobacco must not be overlooked.

Every physician, including the eye physician, must remember the importance of fatigue in producing digestive disturbances. In his classical observations on the stomach of Alexis St. Martin through a traumatic fistula, Beaumont records that in "fear, anger, or whatever depresses or disturbs the nervous system, the villous coat of the stomach becomes sometimes red and dry, at other times pale and moist, and loses its smooth and healthy appearance; the secretions become vitiated, greatly diminished, or entirely suppressed." On the other hand a regurgitation of bile into the stomach was precipitated when St. Martin became very angry. Alvarez[4] suggests that just as sensitive persons blanch and blush externally, so also they may perhaps blanch and blush internally.

* In the symposium, referred to in the abstract, Dr. Derrick T. Vail's paper dealt with this phase of the subject.

Many essays, and a few more extensive monographs, have been written on the subject of headache. Some of these have assembled interesting examples of the influence of headache upon the careers of scientists, artists, and distinguished authors.

It seems probable that Charles Darwin was a victim of uncorrected eyestrain, although the exhaustion which he experienced after facing an audience may have been largely emotional.

Sir Isaac Newton was compelled by headache to abandon his laborious studies on the theory of lunar irregularities; and he states that "his head had never ached but when studying that subject" (quoted in a monograph by Wright[5] on headache). In this case the pain may have been due merely to excessive use of a brain which was threatened with disease.

One of the most famous of English literary critics of the last century, and perhaps the greatest student of the Renaissance period of Italian art, was John Addington Symonds the younger, clearly a victim of chronic tuberculosis, and ultimately dying from the complications of that disease, who suffered greatly from headache and other symptoms in which eyestrain probably played an important part. He is the subject of one of George M. Gould's "Biographic Clinics."[6] Gould, who indignantly rejected the title of "crank," showed his usual extravagance of viewpoint by attributing Symond's tuberculosis to his eyestrain.

It may be that the younger Symonds's headaches, which were treated for some time by his father, John Addington Symonds, Sr., had something to do with the fact that the latter selected headache as the subject of an excellent monograph, which he delivered before the Royal College of Physicians as the Gulstonian Lectures for 1858.[7] Perhaps the elder Symonds has his son's obstinate affliction in mind when he says: "Put all the breast-pains, stomach-pains, and colic-pains together, and you do not make such an aggregate of suffering as is furnished by headache"; and again when he describes the common headache as "that torment to the individual and pest of society, which so often interrupts the daily occupation, spoils the arrangements of social life, and drives the sufferer to the domestic medicine chest, and thence to the family practitioner and the medical celebrities of the day; while but too often, from their baffled science and art, the patient flies frantic with disappointment to a series of quackeries, ending in greater disappointment, because beginning with more extravagant expectation." Probably Symonds again had his son in mind when he described nervous headaches as occurring in "persons of very lively emotions and delicate sensibility . . . among those who have the aesthetical and imaginative elements highly developed . . . the frequent accompaniment and curse of high intellectual endowments," especially "when the functional activity of the brain, whether in perception, emotion, or intellect, is disproportionate to the organic vigour of the rest of the body."

There can be no question that many lives have been ruined by manifestations of uncorrected eyestrain, especially in the form of headache. Too often this fact is overlooked by careless refractionists. George M. Gould, on the other hand, allowed himself to be carried away by an excess of enthusiasm. In his Biographic Clinics (published over a period of seven years) he traced to eyestrain, frequently with headache as a leading symptom, the ill health of De Quincey, Carlyle, Charles Darwin, Thomas Huxley, Robert Browning, John Addington Symonds, George Eliot, Herbert Spencer, James Greenleaf Whittier, Hippolyte Taine, Honoré Balzac, Tschaikovsky, Flaubert, Jonathan Swift, and others. These essays are readable and suggestive but must be accepted with the proverbial grain of salt.

It was Gould who at first estimated that 90 to 95 percent of cases of migraine were due to eyestrain and correctable with glasses, and who subsequently raised this estimate to 99 percent!

As regards migraine, a wiser conclusion is represented by the opinion of a group of leaders in refraction, quoted by Gould, who assented to the following: "I believe that sick headache often

depends on eyestrain, and I have known cases that were cured by ocular treatment."

When every possible consideration as to etiology has been explored and every therapeutic measure tried, it is likely that, as regards many of its victims, migraine will still remain a mystery, will still present unconquerable barriers. In the words of Critchley and Ferguson,[1] migraine "has been the happy hunting ground of the theorist, and the problem has been attacked by representatives of all branches of medicine. Each in turn has discovered in migraine phenomena pertaining to his own specialty; each in turn has hit upon the true nature of the malady; in turn, each has found the infallible remedy."

The ophthalmic physician must at all times be willing to coöperate to the utmost in the attempt to relieve the migraine subject; but he must also recognize that the cause may lie in other fields than his own, and also that cure may be impossible.

Although migraine is ordinarily regarded as "a paroxysmal affection comprising severe unilateral headache, preceded by visual phenomena and followed by nausea and vomiting," Critchley and Ferguson argue that any one or even any two of these classical symptoms may be absent and the diagnosis of migraine still hold good. Thus, according to these authors, the essential disorder may be manifested merely by the disturbance of vision (scintillating scotoma, teichopsia), by the occurrence of paroxysmal headache, or by nausea and vomiting. Usually unilateral, the headache may lack this characteristic and still be migrainous in origin.

In recent years, an interesting addition to the possible causes of migraine, and also to other forms of headache, has been offered by the allergists, and the possibility of allergy as a basis for the disorder must be frankly recognized by the progressive ophthalmologist. It may be true, as Critchley and Ferguson declare, and as Alvarez is evidently also disposed to consider, that the case for the allergic nature of migraine has been overstated. Yet there is most convincing evidence that in some cases, at least, the migrainous attack is provoked by reaction to a foreign protein. Balyeat and Brittain[8] go so far as to say that the exciting factor in migraine is probably always a specific sensitivity to one or more foreign proteins, although there may be many predisposing factors.

In its bearing on the complexity of the problem of allergic migraine, the following comment by Balyeat and Brittain seems worthy of reproduction here: "Practically all investigators give heredity as the most potent factor in the production of migraine. It need not be assumed, as is frequently believed, that the hereditary factor must be migraine itself. . . . It is only one of a number of symptom complexes which are metamorphosed in passing from parent to offspring and arise in different forms in different members of a family. For example, five children in one family might be specifically sensitive to wheat. From such a sensitivity asthmatic symptoms might appear in the first child, eczema in the second, hay fever in the third, urticaria in the fourth, and migraine in the fifth. . . . The type of sensitivity from which the antecedent suffers has no relation to the type the descendent may have." In the series of migraine patients studied by Balyeat and Brittain, a positive family history of allergy was elicited in 47, or 85.4 percent, while there was a family history of migraine in only 25, or 45.4 percent.

Rowe,[9] who feels that every case of migraine should be studied with the possibility of food allergy in mind, makes the following observations: "Many discussions of migraine, even today, lay most emphasis on neurosis as a cause. It is true that many of these sufferers are introspective, analytical, and neurotic. This is due in large measure, however, to their continued effort at self-help since all types of medical treatment have been of little benefit in the past."

Rowe believes that migraine resulting from food allergy is "due to a localized swelling or vascular spasm in the brain. Pain in some cases in the literature," he says, "has been so severe as to suggest brain tumor, and exploration has revealed angioneurotic edema of

the brain itself. . . . Such localized edemas would explain the transient amblyopia, aphasia, paresis, or paresthesia which have been described as complications of migraine for many decades."

Unfortunately, investigation as to substances to which the patient is allergic is expensive and often lacks finality. In addition to the relatively simple scratch tests, intradermal and patch tests and the use of elimination diets are recommended. Quoting from Hinnant:[10] "Probably the laboratory procedure of greatest value in cases of food allergy is the leucopenic index of Vaughan which is based on the principle of hemoclastic crisis as pointed out by Widal, Abrami, and Iancovesco in 1920. The ingestion of foods in normal patients produces a mild leucocytosis. In patients with food allergy, the ingestion of foods to which the patient is sensitive produces a marked leucopenia. Through this simple laboratory procedure, offending foods have been discovered when skin tests, elimination diets, and the food diary have failed. In the experience of Vaughan and other workers, this test has been from 90 to 100 percent accurate."

Although nervous headaches may occur in people whom we do not ordinarily regard as nervous, the victims are often of the type which expends nerve energy excessively in the course of the routine of even a normal day.

When we talk of emotions and their disturbing influence upon bodily functions, we are a little too apt to think exclusively of the major and more obvious emotions of anger, fear, grief, or even joy. But many excellent people, in the course of an ordinary psychologic day, go through a multitude of petty emotional upsets—irritation over what someone else or even the individual himself has done, humiliating incidents hardly recognized as such at the moment and later forgotten, disappointment, eagerness, apprehension, the sense of irksomeness of duties uncompleted, perplexity, suspense, the tension of responsibility, difficulty of concentration in the presence of distractions. It may be said that some persons live almost continually in a state of suppressed excitement, and the possibilities for resulting fatigue of the whole nervous system are readily understood.

The inveterate kindliness of Dr. Oliver Wendell Holmes, displayed alike in his miscellaneous writings and in his medical essays, stands in contrast with his frank recognition of the type of hopeless patient described in the following quotation from his valedictory address, in 1871, to the graduating class of Bellevue Hospital College[11]: "What I call a good patient is one who, having found a good physician, sticks to him till he dies. But there are many very good people who are not what I call good patients. I was once requested to call on a lady suffering from nervous and other symptoms. It came out in the preliminary conversational skirmish, half medical, half social, that I was the twenty-sixth member of the faculty into whose arms, professionally speaking, she had successively thrown herself. Not being a believer in such a rapid rotation of scientific crops, I gently deposited the burden, commending it to the care of number 27, and him, whoever he might be, to the care of Heaven."

In conclusion it may be said that, while the ophthalmologist must neither belittle nor neglect his own possibilities for helpfulness, and must at the same time recognize a variety of possibilities of coöperaton by other physicians, he must in the end be also ready to accept the fact that there are patients who cannot be cured, because it is impossible to obtain their coöperation, either from lack of will or from sheer lack of the necessary mental balance in the patient himself.

530 Metropolitan Building.

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SYMPATHETIC OPHTHALMIA

Part II

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This is the second part of a paper on this subject by the author. Part I appeared in the issue of January, 1936. Part II deals with the pathology and prophylaxis of the disease with statistics as to the outcome of treatment from the reports of Post, Verhoeff, Woods, and Joy. This paper was delivered as a lecture at the Graduate School of Ophthalmology at the University of Rochester, New York, on July 29, 1935. From the Wilmer Ophthalmological Institute of the Johns Hopkins University and Hospital.

Pathology of Sympathetic Ophthalmia

The almost routine procedure of enucleating the exciting eye of patients with sympathetic ophthalmia has afforded a wealth of material for the study of the pathology of the disease. While comparatively few sympathizing eyes, only those enucleated for pain or obtained at autopsy, are available for study, there has been sufficient material studied to demonstrate clearly that both the exciting and sympathizing eyes show exactly the same underlying histological picture.

The pathology of sympathetic ophthalmia was studied extensively by numerous early observers. In 1905, Fuchs published his classical paper in which he described in detail the full pathology of the disease, and emphasized its salient and diagnostic characteristics. Since this paper there has been little added to the picture. The subject has in late years been studied extensively by Samuels.

The essential pathology of sympathetic ophthalmia is an infiltration of the uveal tract, especially of the choroid (fig. 1). This infiltration is characterized by round-cell infiltration, with masses of epithelioid cells and giant cells. The epithelioid cells are larger than the lymphocytes, have an oval, vesicular nucleus, and a large eosin-staining protoplasm. They are probably derived from the monocytic wandering cells or from proliferation of the endothelial cells of the blood vessels. The giant cells are formed by the coalescence of the epithelioid cells, which merge, lose their cell outlines, and therefore show multiple nuclei. The giant cells should not be regarded as an essential characteristic of sympathetic ophthalmia, but rather as evidence of the chronicity of the disease (fig. 2).

There is a remarkable absence of exudates on the surface of the uveal tract. The presence of cyclitic membranes, so commonly observed in the exciting eyes, should be regarded as the result of the preceding traumatic iridocyclitis or endophthalmitis to which these eyes have been subject (fig. 3). The dense membranes sometimes encountered over the lens in sympathizing eyes are usually the result of the the sympathetic infiltration breaking through the degenerated pigment epi-

thelium of the iris, rather than the result of an ordinary inflammatory exudate.

The infiltration of the choroid appears to start with a round-cell infiltration, chiefly around the larger veins in the external layers of the choroid. This cellular infiltration tends to be nodal in character, and epithelioid and giant cells appear. The infiltration spreads rapidly through the outer layers of the choroid, interspersed with masses of epithelioid cells in the center of which giant cells are found. The choroid may become three to four times, or more, its normal thickness. The inner layers, especially the choriocapillaris, although involved, remain relatively free.

A rather characteristic change takes place in the pigment epithelium—the formation of the "Dalen-Fuchs" nodules. In long-standing detachments of the retina, small foci of proliferation, with no inflammatory reaction, form in the pigment epithelium. These normally undergo hyalin degeneration and are the well-known Drusen bodies. In sympathetic ophthalmia, however, these nodules of proliferating pigment epithelium undergo autolysis and are invaded by epithelioid and giant cells which phagocytose the liberated pigment. These nodules of proliferating pigment epithelium with pigment phagocytosis are known as Dalen-Fuchs nodules (figs. 4 and 5).

Large, tumorlike masses of cells may form in the posterior layers of the iris, giving the clinical picture of iris nodules already mentioned. The anterior layers of the iris are usually free and sharply outlined. The cell masses in the posterior layer may break through the disintegrating pigment epithelium, and spread out over the anterior surface of the lens, forming the characteristic posterior synechiae with the clinical appearance of confluence of the iris and anterior lens capsule. In the latter stages of the disease this cellular infiltration of the choroid may disappear and be replaced by a shrunken layer of pigmented connective tissue.

The sclera is often attacked by a spread of this characteristic infiltration. Masses and layers of closely packed cells may infiltrate and split the inner layers of the sclera, especially at the limbus near the root of the iris. This infiltration appears to spread by way of extensions of the uveal tissue that line the emissary veins. It may spread

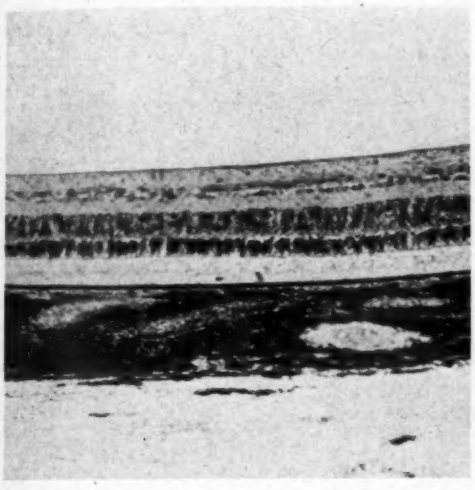

Fig. 1

Fig. 2

Fig. 1 (Woods). Choroid and retina in sympathetic ophthalmia.
Fig. 2 (Woods). Choroid in sympathetic ophthalmia. Epithelioid and giant cells.

Fig. 3

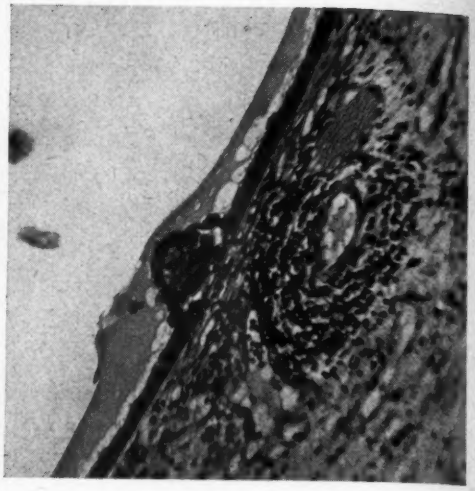

Fig. 4

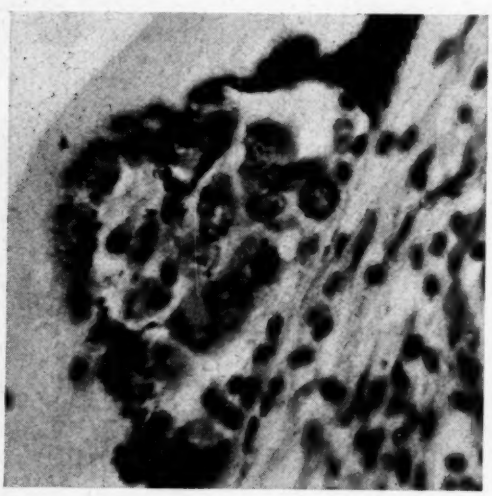

Fig. 5

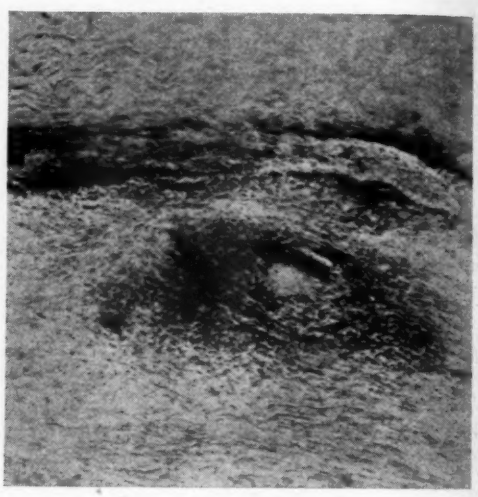

Fig. 6

Fig. 3 (Woods). Sympathetic ophthalmia, exciting eye. Nonspecific traumatic exudate and specific sympathetic infiltration.

Fig. 4 (Woods). Dalen-Fuchs nodule in sympathetic ophthalmia—low power (after Friedenwald).

Fig. 5 (Woods). The same as in figure 4, under high power. Pigment phagocytosis (after Friedenwald).

Fig. 6 (Woods). Sympathetic ophthalmia. Infiltration around perforating vessels of sclera.

out from the emissary veins to the middle layers of the sclera, and even in the external layers of the sclera characteristic nodules may appear about the openings of the emissary veins (fig. 6). Occasionally characteristic nodules have been observed back in the intravaginal space, in the nerve tissue itself, and even between the fibers of the oblique muscles—extension of the uveal inflammation.

The cornea remains free of specific inflammation, participating only secondarily with cellular deposits on the pos-

terior surface, and secondary interstitial edema. The retina likewise remains relatively free, showing at most a round-cell infiltration about the walls of the blood vessels. The vitreous is usually affected and may even be destroyed.

The pathological picture of sympathetic ophthalmia closely resembles that of ocular tuberculosis. The following differential points may be stressed. (1) The infiltration about the emissary veins occurs characteristically early in sympathetic ophthalmia and occurs rarely in tuberculosis, and only in its late stages. (2) The general tendency in sympathetic ophthalmia is to a general uniform infiltration of the whole uveal tract, while in tuberculosis the infiltration tends to be focal and nodular. (3) Sympathetic ophthalmia attacks the posterior layers of the iris, with the formation of complete annular synechiae. Tuberculosis tends to attack the anterior layers, and interferes little with the motility of the iris. (4) In sympathetic ophthalmia the characteristic infiltration spreads to the other ocular tissues only along the extension of the uveal tissue and, while it invades, it shows no tendency to destroy the surrounding tissues, while tuberculosis tends to destroy the surrounding tissues by caseation and necrosis. (5) In sympathetic ophthalmia, even in the early stages, we find phagocytosis of the pigment granules by the epithelioid and giant cells. In tuberculosis we find this pigment phagocytosis only rarely, and then in the late stage of caseation and necrosis.

Blood Changes

In 1910, certain English observers (Ormond; Jones and Browning) reported that in several cases of sympathetic ophthalmia they had observed an increase in the small mononuclear cells in the circulating blood. This phenomenon has since been studied extensively, especially in England, in the hope that it might be an early diagnostic sign. Suffice it to say, that while many patients with sympathetic ophthalmia undoubtedly do show an increase in the mononuclears up to 30 percent, this increase is not constant, and a similar increase may be found in patients with other forms of uveitis. It cannot, therefore, be regarded as a diagnostic nor prognostic sign of any importance.

Prophylaxis

The one recognized and proved preventive for sympathetic ophthalmia is the early enucleation of the injured eye —before it undergoes the characteristic pathologic changes. Even after the characteristic infiltration appears in the exciting eye, if the disease has not already attacked the second eye, enucleation may often protect the second eye against sympathetic ophthalmia. The development of this idea of prophylactic enucleation is interesting.

In his description of sympathetic ophthalmia in 1840, MacKenzie refers to Wardop, who had noted a somewhat similar uveitis in horses, affecting first one and later the second eye. The ocular disease was characterized by repeated exacerbations leading ultimately to blindness. Doubtless he was referring to periodic ophthalmia. The veterinarians at that time noticed that if one eye was destroyed or phthisical, the second eye was not attacked. They therefore adopted the idea of destroying the first eye in order to protect the other. Wardop tried this in horses and was so impressed by the results that he suggested it be tried on human beings. The idea was adopted and urged by other British surgeons, and by the time of Critchett's paper in 1863, enucleation of the exciting eye was an established procedure.

Enucleation of the exciting eye, even before the development of symptoms in the second eye, cannot be regarded as an absolute preventive or guarantee against the later development of sympathetic ophthalmia. Schick collected 80 cases in which sympathetic ophthalmia developed after enucleation of the exciting eye. In the cases of sympathetic ophthalmia reported by Fuchs, Joy, Verhoeff,* and Woods, there are 13 cases of sympathetic disease which developed after enucleation of the exciting eye. These cases are shown in table 4. In the six such patients re-

ported by Joy, sympathetic ophthalmia developed less than two weeks after enucleation of the exciting eye in three instances, and from one to two months after in the other three instances. In the seven such patients in the series of Verhoeff and Woods, the sympathetic disease developed within two weeks after enucleation of the exciting eye. Certainly, therefore, sympathetic ophthalmia is a very real danger for two weeks after enucleation of the injured, exciting eye, and Joy's figures indicate that it may be feared for as long a period as two months.

months after injury. At the time of enucleation the second eye showed only the slightest signs of early uveitis. The enucleated eye showed definite foci of sympathetic infiltration, but the second eye cleared immediately after enucleation, and there have been no recurrences of the uveitis. The converse of Dor's statement, however, is undoubtedly true. Enucleation within two weeks after injury is almost a certain preventive against sympathetic ophthalmia. In the 136 cases in the series of Fuchs, Joy, Verhoeff,[4] and Woods, there is only one instance of sympa-

Table 4

SYMPATHETIC OPHTHALMIA AFTER ENUCLEATION OF EXCITING EYE

Author	No. of Cases	Percentage of his Total	Interval Between Injury and Enucleation	Interval Between Enucleation and Outbreak of Sympathetic Ophthalmia
Fuchs	0			
Joy	6	14.6	14 days 26 days 27 days 3 months 5 months 48 years	4 weeks 2 days 2 weeks 2 months 1 month 9 days
Verhoeff	3	8.6	4 weeks 6 weeks 3 weeks	1 week 2 weeks 1 week
Woods	4	14.3	18 days 28 days 90 days 2 years	8 days 5 days 9 days 3 days

L. Dor believes that if enucleation of the exciting eye is too long delayed, the maximum allowable interval being two weeks, the prophylactic effect of enucleation is lost. Complete agreement with this view cannot be given. We have no way of knowing what eyes may ultimately become exciting eyes. Certainly eyes have been enucleated at much later intervals after injury, and have shown, on histological examination, the earliest possible sympathetic change. Sympathetic ophthalmia did not always progress in the second eye after such delayed enucleations. There is one such case in the author's series in which a lost eye was removed three

thetic ophthalmia developing when the exciting eye had been enucleated within two weeks after injury. This case is in Joy's series. The enucleation was done 14 days after injury and the enucleated eye showed definite early sympathetic changes. Two weeks later, the second eye developed a mild sympathetic ophthalmia, with rapid recovery and normal vision. These figures indicate that enucleation within 14 days after injury protects the second eye against the outbreak of sympathetic disease.

It is generally believed that enucleation of the exciting eye after the onset of sympathetic ophthalmia in the second eye is a valueless procedure and is

not indicated, especially since it is possible that the exciting eye may ultimately have the better vision. If the disease is well advanced in the second eye this is doubtless true. But if the disease is in the incipient stage, it is not so certain. Joy believes, from a study of his collected cases, that better end results were observed in patients whose exciting eye was enucleated than in those in whom it was not done. His figures on this point, however, are not convincing, for the difference in end results is not great, and it is not clear just when the enucleations were done. In the author's series there are at least three cases in which the enucleation was performed in the first few days after the initial symptoms had appeared in the second eye. In all these patients the end result was excellent. Certainly, if the exciting eye is blind, or nearly so, it should be enucleated in all early cases of sympathetic ophthalmia.

Treatment

The one essential aim of local treatment is dilatation of the pupil to prevent pupillary occlusion. With the onset of sympathetic infiltration of the iris, complete posterior annular synechiae form rapidly, and thereafter dilatation of the pupil is virtually impossible. Therefore, in the early stages of the disease every effort must be made to obtain the maximum mydriasis. Instillation of atropine in the conjunctival sac and the daily subconjunctival injection of a solution of atropine and cocaine and of epinephrine bitartrate are the most valuable procedures. As soon as maximum mydriasis has been achieved, whatever the degree may be, only sufficient mydriatic should be used to maintain the dilatation obtained. If posterior synechiae have formed, and it is apparent that mydriatics have no effect, they should be discontinued, for their further use as a therapeutic agent is valueless, can only irritate the eye, and may frequently produce an atropine sensitivity.

The local application of heat is not of great value. The disease affects primarily the choroid and posterior ocular segments. Heat applied to the eye has no effect beyond the iris. The use of deep heat by diathermy has been employed, but there is little evidence that it is of value. Other local procedures, such as subconjunctival injections of mercuric salts, are not indicated. They tend only to irritate the eye and have no effect on the underlying sympathetic inflammation.

A great number of general procedures have been advocated in the treatment of sympathetic ophthalmia. The most valuable single drug is undoubtedly sodium salicylate. H. Gifford advocated a daily dose of one grain per pound of body weight in divided doses with sodium bicarbonate, and today this treatment is an established procedure of undoubted value. Gifford[9] also suggested the use of atophan as a substitute if sodium salicylates were badly tolerated. This, however, is definitely contraindicated by our modern knowledge of its deleterious effect on the liver. If nausea and general systemic reactions make the use of sodium salicylate impossible, aspirin is probably the best individual substitute. Salicylates may be used intravenously in the event of gastric reaction alone.

Jones and Browning have advocated the use of intravenous arsenicals in sympathetic ophthalmia. On the basis of the lymphocytosis so frequently found in these patients, they believed the disease might be caused by some protozoa, and that arsenicals would therefore be of value. There are a number of reports on the use of arsenicals in the disease, but the results are conflicting, some authors reporting improvement in the local picture, with no effect on the recurrence, while other reports indicate that the use of arsenicals is of no value whatsoever.

Nonspecific protein therapy is a recognized procedure of definite value in the treatment of sympathetic disease. The most valuable individual nonspecific agent is undoubtedly diphtheria antitoxin. This has been employed extensively by Verhoeff[8] in the treatment of a large series of sympathetic-ophthalmia patients. The considerations that led to the early employment of diphtheria antitoxin were: "First, that horses were not subject to sympathetic uveitis and hence their serum might be

antagonistic to the disease; second, the serum of a horse immunized to diphtheria antitoxin probably contained enhanced nonspecific factors of immunity; third, that it was remotely possible that the antitoxin itself might be antagonistic to the disease; and fourth, that the serum might act as an anti-anaphylactic, in case the anaphylactic theory of the disease were true."

In practice it is customary to determine first whether or not the patient is sensitive to the antitoxin. This is done by preliminary intracutaneous injection of one drop of the material. If a positive intracutaneous reaction results, desensitization is accomplished by the intramuscular injection of 0.1 c.c., 0.2 c.c., 0.5 c.c., 1 c.c., 2 c.c., and 5 c.c. of the material at intervals of 15 minutes. At the completion of this course of desensitization, the remainder of 20,000 units of antitoxin is given intramuscularly. In the case of children the dose is reduced in proportion. This dose of 20,000 units intramuscularly is given daily for one week. In the event the disease is in the early stage and the ocular congestion subsides in this time, the injections are thereafter given at weekly intervals for several weeks longer. If the case is advanced and there is insufficient improvement at the end of the seven daily injections of 20,000 units, the daily injections are continued until marked improvement takes place, or the patient develops symptoms of an anaphylactic reaction. Thereafter the doses are given at weekly intervals in divided doses. The occurrence of a definite anaphylactic reaction to the horse serum is believed by Verhoeff[9] to be of definite therapeutic value. The results reported by Verhoeff with this form of treatment are on the whole better than those reported by other observers, approximately 66 percent of the patients thus treated ultimately retaining useful vision.

Desensitization with uveal pigment has been proposed and utilized by the author in the treatment of sympathetic ophthalmia. This treatment is based on the conception that pigment allergy is one of the fundamental factors in the etiology complex of the disease, and that by the removal of this factor by desensitization with the specific allergin—an antigen of uveal pigment—one of the essential factors in the disease would be removed and the progress of the disease itself affected. To date we have treated 23 patients. Eight of these were completely blind when first seen, and were treated only with the hope of controlling the active inflammation. The treatment was successful in four, or 50 percent, of these patients. Two patients disappeared from observation while under treatment, and there is no information as to their outcome. In the remaining 13 patients, the treatment was successful in nine, or 70 percent, both as to the control of the inflammation and the preservation of vision. The visual results, however, vary with the stage at which the patient was treated. Five patients were treated early in the disease. Three of these patients, in whom therapy was commenced immediately at the onset of the sympathetic symptoms, healed with 20/15 vision; the other two, treated somewhat later, when the vision had declined to 20/200, showed prompt subsidence of the inflammation with retention of this vision. Of the eight cases treated late in the disease, but still with some vision, five showed complete subsidence of the sympathetic inflammation and four of these had a final preservation of useful vision, while four went downhill steadily to blindness.

Autoserum therapy has been used by a number of authors in the treatment of sympathetic ophthalmia. The principle of this therapy is to remove the patient's own serum and usually to heat it to 60 degrees and then reinject it intravenously, intramuscularly, or subcutaneously. The underlying idea appears to be that this withdrawn serum undergoes some definite change, such as the formation of protein-split products, or some change in the equilibrium of the fluid, which gives the reinjected fluid an enhanced therapeutic effect. It has been used by Guiral and Guiral in the treatment of apparent sympathetic ophthalmia. Its use in sympathetic ophthalmia is definitely open to question, for it is far from evident that the cases reported

by these authors and treated by this method were actually those of sympathetic disease.

On the theory that sympathetic ophthalmia is essentially a tuberculo-toxic disease, various authors have advocated the treatment of sympathetic ophthalmia by the use of tuberculin. The tuberculous nature of sympathetic ophthalmia is, however, far from being a proved or recognized fact, and in the present state of our knowledge the use of tuberculin does not appear to be a justifiable procedure. Certainly no nonspecific effect can be obtained with the extremely small doses in which tuberculin must be used, and the evidence is too meager and unproved to justify its use as a specific therapeutic agent.

The essential treatment of sympathetic ophthalmia is therefore twofold: first, local treatment to obtain the maximum mydriasis; second, general treatment, the basis of which is the use of sodium salicylate and either nonspecific protein therapy, preferably in the form of diphtheria antitoxin, or specific therapy in the form of desensitization with uveal pigment. The other general measures, such as diaphoresis, intravenous arsenicals, and tuberculin therapy, are of no proved value, and only result in the complication of the general picture.

Prognosis

The prognosis in any given case of sympathetic ophthalmia varies with the individual severity of the disease, the time of institution of treatment, and with the thoroughness of the treatment employed. The literature is hopelessly confusing on the question of prognosis. The diagnosis in many of the reported cases is highly questionable, and is not confirmed by microscopic examination of the exciting eye. Many of the reported cases are selected to illustrate certain points of therapy, and illustrate only a portion of the author's experience with the disease. In many other patients the final result is not recorded. The difficulty of estimating the general prognosis is further enhanced by the fact that many patients do not come under observation until the organic changes in the eyes are so advanced that the eyes are hopelessly lost. In such patients we can only surmise the possible result had they received proper treatment early in the disease.

Table 5

ALL CASES, IRRESPECTIVE OF CONDITION WHEN FIRST SEEN

Author	No. of Cases	Favorable Outcome		Unfavorable Outcome	
		No.	Percent	No.	Percent
Post	25	13	52	12	48
Verhoeff	35	24	66	11	33
Woods*	28	12	43	16	57
Joy	37	15	40	22	60
Total	125	64	51.2	61	48.8

8 Blind when first seen.

There are, however, a few reports which give a fair idea of the general prognosis. Post has recently reported 25 cases of sympathetic ophthalmia, all proved by histologic examination of the exciting eye, in which the outcome is given in all instances. To these can be added the 35 cases of Verhoeff,* the 37 cases of Joy, in which the outcome is given, and the 28 cases of Woods. This gives a total of 125 cases, in which we have the final result, irrespective of the time when first seen or treatment instituted. Post reports 52 percent, Verhoeff 66 percent, Joy 40 percent, and Woods

43 per cent favorable outcome—subsidence of the sympathetic inflammation and retention of useful vision. Of the total 125 patients, 51.2 percent showed a favorable outcome, and 48.8 percent an unfavorable outcome. Table 5 shows these results.

These figures do not, however, tell the full story. While it is not so specifically stated, Post's cases were apparently all early cases, in which the eyes were not already lost when first seen. Six of Verhoeff's* cases were apparently hopelessly blind when first seen and treatment instituted. Eight of Woods's patients showed utterly lost eyes when first examined, and treatment was instituted only with the hope of controlling painful inflammation. Therefore if we consider only the early cases, patients who were seen while there was yet useful vision remaining, and who received adequate treatment in this stage of the disease, the prognosis appears better (table 6). Of such cases reported by Verhoeff, 80 percent showed a favorable outcome, and of such cases in Woods's series, 60 percent showed a favorable outcome. Including Post's figures with these, it appears that of patients observed reasonably early in the disease, and receiving adequate therapy, a favorable prognosis may be expected in 66 percent of the cases.

Table 6

EARLY CASES

Author	No. of Cases	Favorable Outcome		Unfavorable Outcome	
		No.	Percent	No.	Percent
Post	25	13	52	12	48
Verhoeff*	29	24	80	5	20
Woods**	20	12	60	8	40
Total	74	49	66.2	25	33.8

* All treated with diphtheria antitoxin.
** Patients observed within first 3 months of disease.

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SCIENTIFIC AND PRACTICAL CONSIDERATIONS INVOLVED IN THE NEAR-VISION TEST WITH PRESENTATION OF A PRACTICAL AND INFORMATIVE NEAR-VISION CHART

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Current near-vision charts are inadequate in many respects. The essential weakness lies in oversimplification. A single card attempts to cover diversified scientific and practical demands, whereas two distinctly different charts are requisite. One should be simple optotypes based on the one-minute angle; the other, a standardized reading text in the various sizes of customary print.

The original charts submitted are processed in a double-faced pyralin panel which renders them permanently changeless and stainless. The optotype side consists of miniature Snellen letter and number series adapted by photoreduction for use at 14 inches. The reading text on the other side consists of three columns: words in point type (Century Schoolbook); numbers of corresponding sizes; and a novel test for the illiterate. This column for the illiterate consists simply of groups of various combinations of x and o, and requires only that the illiterate be able to count. From the Department of Ophthalmology, Northwestern University Medical School. Read at the American Academy of Ophthalmology and Otolaryngology, in Cincinnati, Sept. 17, 1935.

Though near-vision charts were designed before those for distant vision, no model has received an acceptance comparable to the Snellen distance chart, since none has satisfactorily surmounted the many special difficulties inherent in near-vision testing.

Retrospect

The idea of arraying test-letters in series originated with Küchler, who in 1836 presented a near-vision test with a letter gradation from 1.5 mm. (9 point) to 21.5 mm. (120 point). Jaeger in 1857 published in Vienna an extended series, arbitrarily numbered from 1 to 20, and ranging from 0.5 mm. (3 point) to 19.5 mm. (110 point). The type was never standardized and the various editions show considerable divergency in the size, shape, and character of the fonts used.

At Snellen's suggestion (1862), reading charts have since been constructed in which the height of the small lowercase letters subtends a five-minute visual angle at stated distances of 0.37 m., 0.50 m., and so forth. For the abbreviation of meter, there has been unfortunately substituted in many cards the letter D of the Snellen formula, $V = d/D$. Since "D" is the abbreviation of diopter, a curious and fairly widespread confusion has resulted, many men referring to such charts as in the "diopter" system. On one of these charts the refractionist is instructed that "The number over the paragraph will be about the number of convex glasses required for reading and sewing." Of course, such a correlation, though it does occur above 1.00 diopter, is purely accidental.

However, it is impossible to present reading matter in lower case that precisely conforms to the mathematical requirements of physiologic optics. Consequently, in 1885 Oliver[1] advocated that short words in capitals be used instead. From the practical standpoint the unrealistic nature of such a test is objectionable; and the psychologist would not consider that words and the optotypes from which they were formed are on the same level of recognition. The recent American Medical Association card for rating visual efficiency at the near point is based on the Oliver chart, but has been modified for use at 14 inches, and does not confine itself to the seven letters, C D E T O L F, which Oliver considered alone suitable.

In correcting the presbyopia of illiterates the ancient Chinese required the individual examined to look at the ridges on his finger tips. The limited intelligence of the illiterate demands a test of such simplicity. The geometrical symbols devised by Buchardt (1870), Landolt (1888), Fridenberg (1910),[2] Dor (1920),[3] and the pictographs of Ewing (1920),[4] though simple, are not simple enough; moreover, they fail to arouse interest, even in the adult illiterate.

Requirements

The essential weakness of our present reading charts lies in their over-

simplification. A single chart attempts to cover the diversified scientific and practical demands of near-vision testing, whereas two distinctly different charts are requisite: (1) Simple optotypes based on the one-minute visual angle, as in the distance charts; (2) a standardized reading text in the various sizes of customary print.

In addition, the doctor would do well to gather in a scrapbook empiric tests adapted to the individual needs of his clientele, such as cloth with needle and thread; clippings from newspapers and magazines; excerpts from the telephone directory, want ads, and market reports; specimens of music, playing-cards, road maps, and blueprints; samples of handwriting, typewriting, and shorthand; and, when needed, selections from foreign languages.

Miniature optotypes

The reduced optotype is the only scientifically accurate means by which the acuity of near vision can be ascertained. Reading texts can only approximately fulfill the same task. The selected distance chart can be reduced by photographic methods to give equivalent values at whatever near distance is decided upon as standard (Bjerke[5]). With a reduction to 1/17, the six-meter line subtends a five-minute angle at nearly fourteen inches (exactly 13.9 in., 35.3 cm.). This appears to be the most advantageous reduction, for it is in harmony with the efforts of the American Medical Association to standardize near-vision tests at 14 inches. With the miniature charts, as in distance testing, both a letter and number series are desirable.

Correlation of near and distance vision

The visual acuity of the normal accommodating eye, taken with the vertex of the correcting lens at the anterior focal point, is the same for distance and near. This is the result obtained by Bjerke[6] and myself employing reduced Snellen charts, by Landolt[7] using a miniature broken-ring chart, and by Snell[8] with the Oliver chart. Hagner[9] finds from theoretical considerations also that the effect of accommodation should be negligible.

Biedermann,[10] however, reported an increased visual acuity for near, but he made his tests at 25 cm. (9.8 in.) with a miniature Landolt chart produced on a milk-white transparency; and Brückner[11] would discount his findings as probably due to small pupil, variations in illumination and attention, and so forth. Though it is true that objects subtending the same visual angle do not appear to be the same size at different distances (Aubert-Förster phenomenon), this is a purely psychological interpretation, and certainly does not affect the discriminatory power of the retina.

In presbyopia, the correcting lens not only restores the visual acuity for near, but increases the visual image 1.5 percent for each diopter added (Bjerke[12]). In aphakia, the anterior focal point is two centimeters or more from the corneal apex, and a correcting lens placed there would produce an image 1.5 times normal size. But as the lens is generally one centimeter nearer to the eye, this possible acuity is reduced 1 percent for each diopter (Bjerke[12]).

In abnormal eyes, Snell[8] notes that the visual acuity for distance and near is generally parallel, except when the cornea or lens is involved; then there may be a significant difference.

Reading texts

"When the patient reading Jaeger 1 or Thorington 0.50 D asks how this compares with the newspaper, one is not able to answer definitely, as the relative value is not apparent" (Wells[13]). Reading is the predominant interest in near vision, yet (because of considerations which are better realized in reduced optotypes) the reading tests in use have no practical relation to reading experience. From this standpoint an arrangement of a standardized type in the point system would be definitely more useful.

As is now well known, we read in thought units and recognize words largely by their shape.[14, 15] Because of such associations, words may be read when the component letters are so small that they could not be individually identified. Much of the characteristic appearance of a word is due to the fact that

there are three forms of lower-case letters: ascenders, descenders, and small sorts. Hence, to avoid the pitfalls of context and configuration, I would suggest that for the continuous text in our charts there be substituted a series of unconnected words composed wholly of small lower-case letters. This presents no difficulty, since nearly all the vowels and most of the more frequently occurring consonants are in this class. The idea is applicable to all languages written in Latin letters; thus:

English: arc room mason omen crane
French: accuser amas amazon assez
Spanish: acaecer acaro amara amer
Italian: acume acro acrezza acre acervo
German: anmassen arm azurn man aus

The point system

In the point system the various sizes of type bodies bear a fixed and simple relation to one another. According to the American system—adopted in the United States in 1886, and in England in 1898—the point is nearly one seventy-second of an inch or 0.35 mm. The basic idea originated with Fournier in 1737. Benjamin Franklin, while in France, purchased some of Fournier's foundry materials, which in time came into the possession of the leading American type-founding company, and became the models for their later designs. After the Chicago fire, John Marder, whose type foundry had been destroyed, moved the adoption of a point system based on their pica type, then in most general use. Consequently, the Fournier system, used in Belgium and parts of France and Austria, and the American system are practically identical.

The point system refers to the size of the type body without reference to the print. In any particular type design, however, the heights of the various characters bear a definite relationship to the size of the type. Thus in Century Schoolbook type the small sorts are just half the point size, so that when the body is 10 point, their height is five seventy-seconds of an inch or 1.75 mm. (5 x 0.35 mm.).

Century Schoolbook type

The Century Schoolbook type seems the most suitable design on which to standardize our reading tests since it is the result of an effort to produce the most legible type possible. The project was inspired by the Reports of the Committee to Inquire into the Influence of Schoolbooks upon Eyesight (1911-1913) appointed by the British Association for the Advancement of Science.

The design of Century Schoolbook is simple, fairly broad, with fairly thick lines, fairly wide spacing, and with not too much contrast of thickness and thinness. It is based upon the popular Century Expanded, an Old-Style face created by DeVinne, the master type designer of modern times.

Presentation of an original chart

Description. The two cards submitted are intended to supply the examiner conveniently with essential informative data as well as to provide for nearly all the requirements of near-vision testing. The first chart contains an explanatory paragraph; optotypes in two series; letters and numbers; and a staff of music. The second chart consists of three columns: words in point type; numbers of corresponding size; and an illiterate test.

The optotypes. The optotypes on the chart give a sequence of distance equivalent from 20/13 to 20/800. The distance Snellen charts from which the reductions were made were selected because they are among those most widely used, have an adequate range, and a corresponding letter and number series. The lower group (20/13 to 20/100 equivalent) represents a 1/17 reduction; the upper group (20/200 to 20/800 equivalent) a reduction of 4/17.

For each line the visual acuity is noted in four sets of interpretative data: decimal notation: reading norm (distance at which letter or number subtends the five-minute angle) in centimeters and inches; distance equivalent; and visual efficiency.

Music. Music was included because it is so commonly needed as an empiric test. The 1½-inch staff chosen is fre-

quently found in cheap editions, though the usual height in this country is two inches. The selection is the opening bars of our national air which so appropriately begins: "O say, can you see, by the dawn's early light. . . ."

Reading test. The reading test consists of words composed wholly of short lower-case letters, such as: wax see now zero arrow cream numerous occurrence nevermore—without any ascending, descending, or dotted characters. There is no context and no variation in contour to suggest clues to the memory. Of the 13 letters used, Sanford[16] considers w m v the easiest to recognize, r x n u as moderately difficult, and a z o c e s the hardest. Of the eight most frequently occurring letters in English, five are represented by the short letters e a n o s.

The series extends from 24-point Century Schoolbook, the largest size used in books, to 2-point of the same type, which at 14 inches is beyond the limit of average discrimination. There is thus on the chart an end point for any individual's reading ability. Each gradation is furnished with data as to its letter height in millimeters; the visual acuity required—noted decimally and in distance equivalent; and its customary use in reading experience. (In rural newspapers 8-point type is customary, but in the city papers 7-point type is generally used. The "Chicago Tribune" uses 7-point Regal; the "Chicago Daily News," 7-point Ideal.)

Numbers. The value of numbers in near-vision testing has not been sufficiently appreciated. They are international symbols, universally recognized by all who have the least degree of literacy. When standardized, as in this chart, they are the preferred test for the foreigner, especially so if his language is customarily printed in nonroman characters, as with Russian, Greek, Yiddish, and German gothic.

Illiterate test. The illiterate test consists of four- and five-letter groups of various combinations of x and o. The illiterate is asked simply to count the "crosses" in each group, as in: oxxo oxoxx. The examination requires only that the child or illiterate be able to count. The reliability of the test has been checked by experiments with literates.

Format. A clean test chart is of the utmost importance, since the loss of contrast in a soiled chart must impair its validity. The efforts heretofore made to maintain the cleanliness of charts have been only moderately successful. I believe that the format ushered in by this chart solves the problem. A double-faced panel is fashioned by fastening on each side of a six-by-eight-inch piece of plywood a chart over which a thin sheet of pyralin is welded by heat and pressure. The finished product looks as if covered by a fine, clear lacquer. The pyralin panel is durable, shatter-proof, artistically attractive, and easily cleansed; the charts thus processed remain permanently stainless and changeless. In using the charts, a measuring cord attached to an eyelet on the panel's edge is secured by a hook to the end-piece of the patient's glasses or trial-frame, and when taut keeps the card at the required distance. For further convenience, there is affixed to the other edge of the panel a metal pointer.

Procedure. A few hints may be apropos as to the many uses of the chart. The distance vision is noted; *then the brightness of the near-vision chart is adjusted to a standard of ten candle-power,* preferably with the aid of a light meter. In the systematic examination, the following outline is suggested:

I. Using optotypes,

A. Without distance correction, examine for

1. Near visual acuity (nV). This often provides an immediate basis for the judgment of the patient's refraction, since normally, and in most cases of ocular disease, the near visual acuity corresponds to that for remote vision (rV); but it is greater in myopia, less in hypermetropia and presbyopia. Even in the presbyopic, an idea of the distance refraction is obtained through the difference between their actual near vision and that to be normally anticipated.

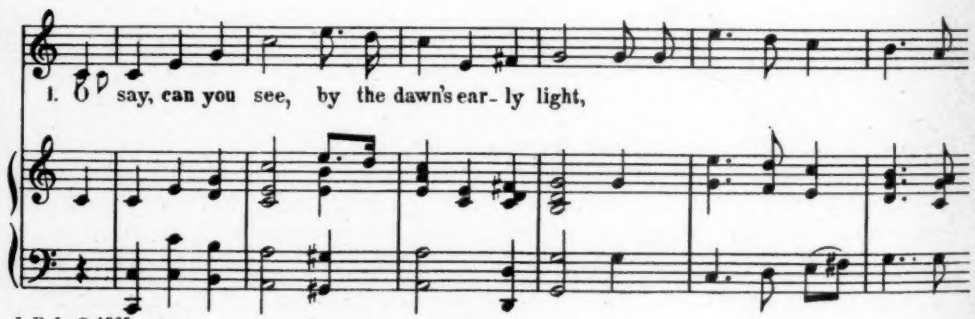
2. Far point of myopia. With the patient fixating on optotype 0.6, move chart away to the point of blurring. If

NEAR VISION TEST CHARTS

As designed by Dr. James E. Lebensohn,
Northwestern University Medical School, Chicago

The charts are to be read at 35 cm. (14 inches); (exactly 35.3 cm.; 13.9 in.) The reading visual acuity obtained from the miniature Snellen charts can be expressed in terms of distance equivalent, visual efficiency, or—as with corresponding distance charts—decimally, or in fractions. Thus "normal" reading visual acuity 1.0 can be recorded: 20/20 equivalent; 100% efficiency; 35/35; or 14/14;—reading visual acuity 0.8 as : 20/25 equivalent; 95.6% efficiency; 35/44; or 14/17. The adjoining test with point-type (Century Schoolbook) indicates what this means in practical reading ability. The left column therein is for illiterates who are simply to count the "crosses" in each group as in : oxxo oxoxx.

Decima. notation	Reading norm Cm.	Reading norm In.		Distance equivalent	Visual efficiency
0.025	1412	560	L 85	20/800	0.1%
0.050	706	280	F D 293	20/400	3.3%
0.075	471	187	E C T 8754	20/260	11.7%
0.1	353	140	L Z T D 63952	20/200	20.0%
0.2	176	70	F P 293	20/100	48.9%
0.3	118	47	T O Z 8754	20/65	66.8%
0.4	88	35	L P E D 63952	20/50	76.5%
0.5	71	28	P E C F D 428359	20/40	83.6%
0.6	59	23	E D F C Z P 3748285	20/30	91.4%
0.8	44	17	F E L O P E D	20/25	95.6%
1.0	35	14		20/20	100.0%
1.2	29	12		20/16	
1.5	24	9		20/13	



J. E. L. © 1935

Letter height— 4.2164 mm.

24 Point

Acuity: Approx. 0.12 (20/170) Sight-saving texts.

man oxen 25 37 84 90 OXXO OXXX

Letter height— 3.2512 mm.

18 Point

Acuity: Approx. 0.15 (20/130) Books, children 7-8 yrs.

raw see van 90 89 76 60 54 XOXXX OXOOO

Letter height— 2.5146 mm.

14 Point

Acuity: Approx. 0.2 (20/100) Books, children 8-9 yrs.

noon even mew 38 72 80 93 54 60 76 XOXX XXXX OOOX

Letter height— 2.0828 mm.

12 Point

Acuity: Approx. 0.25 (20/80) Books, children 9-12 yrs.

war use worm eve 40 53 82 64 79 60 47 XOOX OOOXO OOXXX

avenue ransom err 809 423 657 980 765 XOXXO XOXOX OXOOX

Letter height— 1.7526 mm.

10 Point

Acuity: Approx. 0.28 (20/70) Adult textbooks.

scum crease nervous 98 67 45 34 23 50 86 73 98 XOOO OXXO OXXX XXXX

cocoon cannon saucer 456 309 582 740 605 482 765 OXXOO OXOOO OXOXO

Letter height— 1.5748 mm.

9 Point

Acuity: Approx. 0.3 (20/65) Magazines.

arrow scour noose razor 35 98 20 82 47 30 74 73 42 65 27 XXXO OOXX OXOOX XOXOX

zone reverence sorceress 740 203 965 423 807 203 460 244 XOOXX OOXOO OOOOX OXOX

Letter height— 1.3970 mm.

8 Point

Acuity: Approx. 0.4 (20/50) Newspaper text

amaze wares curve scarce 82 34 65 90 58 83 67 46 98 65 42 54 OXXO OOOO XOXX XXXX OOOX

snooze caress sewer wax 426 397 564 752 205 350 575 369 246 XXXOX XXOOX OOXXO XOXOX

Letter height— 1.0414 mm.

6 Point

Acuity: Approx. 0.5 (20/40) Telephone directory.

comma worse reason measure vase 75 23 68 90 44 63 40 53 82 64 79 60 47 35 XOXX OOXO OXXO OXOO XXOX OOOO

census arrears recover crane now 890 375 204 534 626 987 654 932 246 479 268 XOXXO XXOOO OOOOO OOXOO XOOOX

Letter height— 0.8763 mm.

5 Point

Acuity: Approx. 0.6 (20/30) Want ads.

success numerous assurance consume 56 87 92 30 47 62 45 27 98 80 46 23 43 80 XOXX OOOX OOXO OOXXX XOXO XXOX OXOO

cocoa convex morocco uncommon err 209 354 872 405 625 829 204 350 575 482 657 OXOOO OXOXO XXXXO OOXXO XOXXX OXXO

Letter height— 0.6985 mm.

4 Point

Acuity: Approx. 0.8 (20/25) Small bibles.

occurrence nevermore successor romance worm 72 95 40 58 36 55 80 65 30 87 98 46

efflux arson crew amorous scow aroma samovar 284 484 206 906 263 460 244 820 350

Letter height— 0.5207 mm.

3 Point

Acuity: Approx. 1.0 (20/20) Mailorder catalogues.

Letter height— 0.3493 mm.

2 Point

Acuity: Approx. 1.5 (20/13) Photo-reduction.

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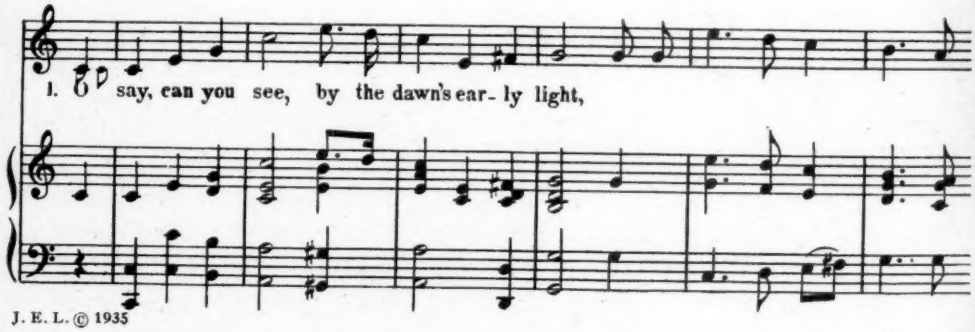
0.5	71	28	F E C F D 428359	20/40	83.6%
0.6	59	23	E D F C Z P 3748285	20/30	91.4%
0.8	44	17	F E L O P E D 9378683	20/25	95.6%
1.0	35	14	D E F P O T E C 8864793	20/20	100.0%
1.2	29	12	E D E F O P C T 7978864	20/16	
1.5	24	9	F T E O D L P C 4793	20/13	



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Letter height— 0.3493 mm.

2 Point

Acuity: Approx. 1.5 (20/13) Photo-reduction.

this distance is beyond 22-23 inches (average norm), continue with the patient fixating on the next larger optotype, and so on.

3. Range of accommodation. In dealing with mild myopia, hypermetropia, or presbyopia, a +3- or +4-diopter sphere is placed before the eye, as suggested by Duane, and the near point and far point measured in diopters on a Prince's rule—measurement to start from the anterior focal point, 14 mm. in front of the cornea. The difference is the range of accommodation. This method is also recommended for testing the adequacy of cycloplegia.

4. Estimation of visual acuity as a substitute for the distance test:

(a) With hospital, house, or bed cases, where it is impractical to set up or utilize a distance chart, the progressive changes in visual acuity can be regularly recorded with the reduced optotypes.

(b) In the office, when the distance vision is below 20/200: Instead of having the patient walk to the chart, the distance equivalent can be determined at 14 inches. Vision as low as 20/800—which is equivalent to counting figures at two feet—can be thus conveniently measured.

B. With distance correction, can be demonstrated:

1. Near point of accommodation. Optotype 1.5 (average norm, 9 inches; 24 cm.) is adapted for this purpose.

2. Presbyopia. Reduction in near visual acuity parallels the recession of the near point. The decline duplicates that section of Donder's curve extending beyond 35 cm. Roughly, a reduction of normal distance acuity to 20/30 or 20/40 equivalent for near means 1.00 D. of presbyopia; and each succeeding notation represents a half diopter more. Thus a reduction to 20/50 equivalent means about 1.50 D. addition; to 20/65, 2.00 D.; to 20/100, 2.50 D.; to 20/200, 3.00 D. With the proper addition, the acuity finally attained should equal that for distance, or be only slightly less.

3. Value of increased illumination. That "more light means better sight"[17] is readily proved by the optotype chart and the variable illuminator. With the vision at 1.0 (20/20 equivalent) at 10 candle-power brightness, it reaches to 1.5 (20/13 equivalent) with an increase to 80 candlepower.

4. Malingering. In simulation there is apt to be a marked difference between the visual acuity acknowledged for distance, and that to be correspondingly expected for near.

5. Visual efficiency. The formula for total visual efficiency proposed by the American Medical Association is:

$$\frac{rV.E. + 2\ nV.E.}{3}$$

. To illustrate: A myopic person with —9.75 D. sph. as the best correction has a distance acuity (rV) of 20/40; with —6.00 D.sph. the visual acuity for near (nV) is 20/30 equivalent. The total visual efficiency is

$$\frac{83.6 + 2 \times 91.4}{3}$$

hence or 88 percent.

In medico-legal work this chart should be a useful supplement to the American Medical Association rating card, as it shows certain gradations not present in the other.

Though the Jaeger series merits but historical interest, many industrial boards still require that near vision be recorded according to the Jaeger classification. What the Jaeger numbers mean in modern printing nomenclature is indicated in the following table (Century Schoolbook):

Jaeger series	1	2	3	4	5	6	7
Point system	3½	4½	6	7	7½	8	10
Jaeger series	8	9	10	11	12	13	14
Point system	12	12½	13	14	16	18	24

II. Using point-type chart, a basis is provided for

1. Judgment of patient's reading ability. This does not correspond to the smallest type visible (punctum remotum) but to the punctum optimum, which usually represents a 50 percent larger visual angle (Snell[8]). Thus, to read 6 point comfortably demands that the patient discern at least 4 point at the same distance; to read 24 point (sight-saving texts), at least 16 point should be legible; reading 9- or 10-point type (upper-class work) requires

a minimum of 6-point visual acuity. This divergence is explainable by a study of the reading movements, which indicate that a considerable part of the printed line is imaged, not on the fovea, but upon the parafoveal region (Roethlein[18]).

2. Concluding test in presbyopia. In correcting presbyopia, the preliminary examination with optotypes is intended to give only the approximate correction. The final adjustment is determined with the point-type chart. The distance at which the patient does his work is carefully noted. For 14 inches or beyond, the attention should be directed to the 4-point type; for less than 14 inches, the 3-point type may be attempted.

The accuracy and latitude of these charts may suggest further uses.

I am indebted to Professor Sanford R. Gifford for encouragement, suggestion, and criticism; and to Dr. A. C. Snell of Rochester, N.Y., to the American Type Founders Sales Corporation, and to the National Society for the Prevention of Blindness for important data.

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STUDIES ON THE INFECTIVITY OF TRACHOMA

IV. On the bacteria cultivable from trachoma and clinically similar conditions

R. W. HARRISON, PH.D. AND L. A. JULIANELLE, PH.D.
SAINT LOUIS

An investigation of the bacterial flora in 243 cases of uncomplicated trachoma has been made. For comparative purposes cultures were obtained also from the conjunctivae of (1) a group of normal persons, (2) 50 cases of spontaneous folliculosis in children. (3) 10 cases of inclusion blennorrhea, and (4) a variety of acute conjunctivitides of uncertain diagnosis. No organism cultivated was typical of trachoma. The flora did not vary with severity or clinical stages of the disease or with presence or absence of epithelial-cell inclusions. All bacteria encountered in trachoma were isolated with similar frequency in other eye conditions. The same bacteria were also found in normal eyes, although less often.

Individually or pooled, each variety of organism isolated was inoculated a number of times into the conjunctivae of monkeys. Experimental trachoma was never induced even though the tissues from which the cultures were isolated did produce this condition. Filtrates of infectious trachomatous material when inoculated together with cultures supplied no supplementary factors capable of rendering the organisms specifically infectious.

It is concluded that none of the bacteria cultivable from trachoma is able to induce the experimental disease in monkeys. From the Oscar Johnson Institute, Washington University School of Medicine. Conducted under a grant from the Commonwealth Fund of New York, N.Y.

While engaged in an intensive study devoted to the etiology of trachoma corroborative evidence[1] has been brought forward from this laboratory which demonstrates that the disease is transmissible to animals with certain modifications and that it is infectious in nature. That the experimentally induced infection is specific[2] and unrelated to deficient or faulty nutrition[3] either as a causal or associated factor has also been determined. As others have shown previously, further experiments indicated the likelihood that under specified conditions the infectious agent of trachoma does not readily traverse Berkefeld filters.[4]

Concurrently with the studies already reported, an investigation was made of the bacteria cultivable from trachoma and, for purposes of orientation and control, from clinically similar conditions, as well as from normal eyes. That a number of bacteria[5] have been incriminated in the past as incitants of trachoma accentuated the necessity of such a study conducted carefully and elaborately. While the great majority of the organisms considered causally related to the disease had been eliminated before this work was initiated, the recentness of Noguchi's[6] discovery of Bact. granulosis still necessitated a bacteriological study. It is true that in the meantime the accumulated literature on Bact. granulosis, carefully analyzed by Bengtson[7] and Weiss,[8] had begun to alter the original conceptions regarding the specificity of this organism. A number of human inoculations,[9] particularly well controlled by Thygeson,[10] eventually nullified the single experiment in which Addario[11] reported trachomatous changes following administration of Bact. granulosis in the eye of a human volunteer.

Upon undertaking this study, it was proposed to determine the bacterial flora accompanying trachoma and then to study in monkeys the conjunctival reaction in response to inoculation or injection of the organisms isolated.

Methods

Culture material. Material for culture was obtained in most part from patients with early uncomplicated trachoma varying from two weeks to a few months in duration. A small number of patients had old chronic cases; most of them were undergoing acute recurrences of the disease at the time of observation. The majority of the individuals studied were from the Ozark Mountains and had been brought for treatment to the U. S. Trachoma Hospital at Rolla, Missouri. Others from whom cultures were made were Navajo Indians at Fort Defiance, Arizona, and native whites in Kentucky, Tennessee,

Georgia, Oklahoma, Missouri, and southern Illinois.*

Material for culturing was obtained by scraping the conjunctiva with a sterile platinum spatula, and by grattage. In occasional patients, when indicated therapeutically, tarsi and fragments of tissue were excised and studied. The tissue obtained was ground in sterile mortars without the use of sand or other abrasive. The material obtained by scraping the conjunctival surface was inoculated immediately on plates containing different media and into leptospira semisolid agar. Tissue fragments removed by grattage were collected in sterile 0.85 percent salt solution, broth, or Tyrode solution (1.5 c.c. per patient), and this was inoculated immediately into various media and, after transportation to the laboratory within a time interval of a few hours, was cultured in serial dilutions of 1:10 to 1:10,000 or 1:100,000. The number of separate cultures made from each patient averaged 20 for the first 82 patients and 10 for the whole series.

Cultures from 50 cases of spontaneous folliculosis and 10 infants with inclusion blennorrhea were taken following the same methods. In addition, cultures were made from material obtained by swabbing the conjunctivae of 20 normal persons and 20 patients with miscellaneous chronic eye diseases of unknown etiology and uncertain diagnosis.

Culture media. The culture media used were veal-infusion broth, Noguchi's semisolid leptospira agar, fresh rabbit kidney in ascitic fluid, sealed with sterile vaseline, Levinthal's agar with 2-percent sodium oleate, and veal-infusion agar enriched in various ways. The latter included rabbit or horse blood, alone or with 1-percent dextrose, and with the mixture of sugars used by Noguchi for isolation of Bact. granulosis[6]; serum agar (1-percent horse serum) with 0.5-percent hemoglobin and the sugar mixture mentioned above; and in some cases 0.1-percent cystine was also added. All media were adjusted to pH 7.6.

The media were varied in concentration of peptone, agar, and blood. The percentage of blood was varied between 2 percent and 16 percent and four different peptones, Difco, Witte, Pfanstiehl, and Neopeptone were used. There were no appreciable differences, however, in variety or comparative numbers of organisms isolated, between a sufficient number of parallel cultures from the same patients.

Incubation of cultures. Cultures were incubated for periods of five days to two weeks before examination unless contaminated with molds or spreaders. All plate cultures were sealed with adhesive tape to retard evaporation. These measures were made necessary by the occurrence of slow-growing bacteria in the conjunctival sac.

In the earlier part of the work, duplicate cultures were grown aerobically and anaerobically at both 30° and 37°C. Anaerobic methods were subsequently discarded when it became evident that obligate anaerobes occurred with exceeding infrequency. After a large number of cultures (from 82 patients), it also became apparent that, with the media used, incubation at 30°C. gave more satisfactory results in that slow-growing organisms were more often overgrown by Staphylococcus at 37° than at 30°; some of the organisms encountered grow better at the lower temperature; and in almost every instance all bacteria grown at 37° were also isolated from 30° cultures. These results are not surprising when the exposed position of the eyelids and consequently their lower temperature are considered. Incubation of subsequent cultures at 37° was accordingly discontinued.

Isolation and identification of organisms

Plate cultures were examined without opening during the first few days

* Acknowledgment of indebtedness and appreciation for diagnosis of the patients and for coöperation in obtaining material is made to Drs. C. E. Rice, Robert Sory, J. E. Smith, P. E. Faed, and B. C. Welch of the U. S. Public Health Service; to Dr. P. D. Mossman, then of the U. S. Indian Service; to Dr. A. F. Lenzen of the Illinois Trachoma Eradication Program.

of incubation, and colonies which appeared late were particularly noted. When the plates were opened, the different kinds of colonies were described and counted and examined microscopically after gram staining. Organisms not readily identified were subcultured and classified later. Cultures in semisolid and fluid media were first examined microscopically and then reseeded on blood-agar plates to obtain pure cultures for identification.

plate cultures from 50 patients selected at random. It was impossible, however, to determine accurately the actual amount of material seeded on a plate, so that the figures express relative values only. This summary is given in table 1.

An analysis of this protocol reveals a number of interesting observations. It will be seen that diphtheroids and staphylococci were encountered with far greater frequency than any other

Table 1

THE FREQUENCY AND DISTRIBUTION OF THE BACTERIA ISOLATED FROM 243 PATIENTS WITH TRACHOMA

Organisms Isolated	Occurrence in 2346 Primary Cultures		Distribution Among Patients		Average Number of Colonies per Plate*
	Number of Times Isolated	Percent of Total Cultures Positive	Number Positive	Percent Positive	
Diphtheroids	1270	54.1	226	93.0	7.4
Other gram-positive rods	344	14.6	157	64.6	0.3
Staphylococci	1230	52.4	233	95.9	3.6
a. Hemolytic	688	29.3	187	77.0	1.7
b. Nonhemolytic	810	34.5	213	87.6	1.9
Strept. haemolyticus	46	2.0	9	3.7	0.3
Strept. viridans	24	1.0	13	5.3	0.2
Strept. anhaemolyticus	19	0.8	17	7.0	<0.1
Pneumococci	31	1.3	13	5.3	0.1
Other gram-positive cocci	344	14.6	151	62.1	0.5
Gram-negative cocci	56	2.4	36	14.8	0.3
Gram-negative rods	524	22.3	157	64.6	0.8
Yeasts	27	1.1	25	10.3	<0.1
Filamentous forms	42	1.8	36	14.8	<0.1

* Average numbers of colonies per plate were computed from 250 primary plate cultures selected at random from the 243 cases studied.

The results of the cultures reported in this communication have been derived from 243 patients with trachoma. Exclusive of cultures in broth and those heavily contaminated with molds or air borne bacteria, 2346 primary cultures were made. In order to facilitate an explanation of the data bearing on the cultivation experiments, an attempt has been made to summarize comprehensively the results of the cultures in protocol form. The distribution of the different bacteria cultivated has been tabulated in terms of percentage of total cultures as well as of patients, and, that an example of the frequency of occurrence might be conveyed, an enumeration is appended based on 250

organism, with the former slightly predominant. The diphtheroids presented the usual pleomorphic variations in colonial appearance and staining reactions, while the staphylococci were not only of the hemolytic and nonhemolytic varieties, as indicated in table 1, but they exhibited gradations in elaboration of pigment from white to deep golden yellow. Since these variations, however, appeared to have no particular significance in the etiology of trachoma, it does not seem necessary to pursue them further.

In addition to the diphtheroids, other gram-positive rods were isolated from a majority of the patients. These organisms were largely comprised of sap-

rophytic forms. A small number of spore-forming bacteria are included in this group, but for the great part the organisms were very small and nonsporulating, and some of them were chromogenic. They were subcultured for further study and an attempt was made to classify them in a manner similar to that described below for the gram-negative rods.

Streptococci were isolated from a small number of patients. The hemolytic variety was isolated 46 times (2.0 percent), the viridans 24 (1.0 percent), and the nonhemolytic 19 times (0.8 percent). Yet, in terms of patients, the order of the frequency of occurrence is completely reversed as 3.7 percent, 5.3 percent, and 6.9 percent, respectively. In other words, when streptococci are found in patients, the hemolytic form grows most profusely. In general, it may be said that the streptococci on the conjunctiva in trachoma are of low virulence since none of the patients from whom the cultures were isolated showed any signs of postoperative infection. Moreover, a few strains of hemolytic streptococci injected intraperitoneally in white mice produced no special clinical signs.

Pneumococci were also isolated from a small number of patients (5.3 percent). They were differentiated from streptococci by bile-solubility tests. None of the strains was virulent for mice, and by agglutination tests with antisera of the fixed types, they were classified as group IV.

Other gram-positive cocci were isolated from 62 percent of the patients. They were not present in large numbers, so that they were rarely isolated in the higher dilutions of original material. They were obviously of the commoner saprophytic forms and included for the most part cocci of the tetragenus and Sarcina arrangement. It is safe to assume that they were only adventitiously present in the conjunctiva.

Gram-negative cocci were isolated in small numbers from about 15 percent of the patients. The majority were classified as belonging to the M. catarrhalis group and were considered as common saprophytes. In contradistinction to its presence in Egyptian trachoma, the Gonococcus was never isolated.

While present on the conjunctiva of a large portion of patients (about 65 percent), gram-negative rods occurred in small numbers. Most of these grew relatively slowly, requiring two, three, four days or more before they appeared in culture. About half were chromogenic to some degree, and many resembled Bact. granulosis in superficial appearance. A few strains were hemoglobinophilic, later identified as Koch-Weeks bacilli, while occasional cultures were found to be Morax-Axenfeld bacilli.

Of the cultures resembling Bact. granulosis, five strains were subsequently identified as this organism by agglutination in specific antisera.* In each instance, the organism was isolated on dextrose blood-agar plates prepared according to the formula used for all the cases. It grew in more or less close proximity to colonies of Staphylococcus, an observation already made by Olitsky and Tyler.[12] On one occasion, Bact. granulosis was isolated from a patient with an eye condition of questionable diagnosis. While at the time the condition was suspected as trachoma, it may be significant that in the two years and more of constant observation the cornea has never exhibited the changes usually associated with trachoma.

After determining their inagglutinability in antigranulosis sera, the remaining strains of the group of gram-negative rods were studied for purposes of identification and classification. Each culture was observed for cell and colony morphology, growth in broth, motility, and ability to survive on plain nutrient agar. All were tested for gelatin liquefaction, nitrate reduction, production of indole, and fermentation of dextrose, maltose, lactose, sucrose, and mannitol. On this basis they were tentatively separated into 10 groups.

* The identity of the first three strains of Bact. granulosis isolated in this laboratory was subsequently verified by Dr. P. K. Olitsky of the Rockefeller Institute and by Dr. I. A. Bengtson of the U. S. Public Health Service.

Rabbit antisera were then prepared for one or two cultures of each group. Each antiserum was tested against all or a majority of the cultures within the group and against a number of strains from other groups. Agglutination tests showed no antigenic relationships within the groups arranged on the basis of morphological and biological properties and failed to establish any other classification of the cultures. It was not possible, therefore, to identify a large number of the gram-negative rods isolated from the patients with trachoma.

Yeasts and filamentous forms never developed more than one or two colonies per plate, and they were considered as adventitiously present.

An attempt was made to correlate the presence of certain bacteria with the presence or absence of epithelial-cell inclusions. The results show clearly that no difference is demonstrable in the distribution and occurrence of bacteria between patients with inclusions and patients without inclusions. Likewise, comparison of the flora of early trachoma with that of chronic trachoma showed no significant variations.

Cultures from 50 cases of folliculosis in children, 20 patients with various chronic conjunctivitides, and 10 infants with inclusion blennorrhea included practically all the bacteria isolated from trachoma. The relative frequency and distribution of the organisms so closely approximated those found in trachoma that there is nothing to be gained by a discussion devoted to the bacteria isolated from these conditions. The cultures from normal eyes are not strictly comparable since the methods of obtaining material for inoculation were different. Nevertheless, it may be said that inocula obtained by swabbing in these instances were relatively free of bacteria. While a few colonies of diphtheroids and staphylococci were cultivated from each individual examined, other organisms occurred rarely and were like those found in trachoma.

Inoculation of cultures in monkeys (M. rhesus)

Early during the course of this work, it was proposed to study the specific infectivity of the different varieties of bacteria isolated from trachoma rather than to disregard any as extraneous or casual organisms secondarily present during the disease. Because it was already recognized that there is considerable variation both in the infectivity of trachomatous tissues and in the resistance of monkeys to this infection, it became necessary to correlate the results observed following inoculations not only of cultures but of the tissues from which the bacteria were cultivated; and, if necessary, to determine ultimately the susceptibility of the monkeys inoculated. In actually performing the experiments, then, it was found wise to inoculate cultures before determining the infective capacity of the original tissue (since the incubation period in monkeys may vary to one month) and compare the results later. This was done to avoid the possibility of rapid loss of virulence by the cultures during the interval required as incubation period. Consequently, cultures were administered as soon as possible after isolation, so that a number of the cultures inoculated were derived from what eventually proved to be noninfectious material. In general, the bacteria inoculated were initial plate cultures or first subcultures.

A total of 116 cultures, many of them closely related strains from different patients, were obtained from 31 patients, and these were inoculated into 56 monkeys. All inoculations were made with young cultures, either by swabbing after light scarification of the conjunctiva, or by broth instillation and subconjunctival injection after pricking the surface with the charged needle. Inoculations by swabbing were made either directly from plate colonies or from subcultures in semisolid leptospira medium, while the subconjunctival injections were made with cultures suspended in nutrient broth or with cultures grown in leptospira medium and undiluted. The latter method was employed in order to establish agar foci of the particular organisms in the conjunctival tissues. At first, individual cultures were inoculated, and later pooled suspensions containing from two to eight organisms from a patient or series of patients. When pooled the

cultures were combined in approximately the proportions in which they were isolated. A total of 78 inoculations was made in monkeys, and some of the monkeys were employed for more than one inoculation. In some instances the same strains were inoculated repeatedly over a period of time, in which case this was regarded as a single experiment.

A summary of the experiments on the infectivity of the bacteria isolated from trachoma is given in table 2. Before analyzing the data in this protocol, it should be pointed out that most of the inoculations were followed by a transient, localized infection readily characterized as an acute conjunctivitis of varying intensity. Material from 16 patients was found to be infectious in the sense that it induced experimental trachoma in monkeys, while the tissues from 15 patients were found to be noninfectious. With 81 cultures derived from infectious tissues, 56 inoculations were made in 40 monkeys. None of these animals gave any clinical signs of experimental trachoma. With 35 cultures derived from noninfectious tissues, 22 inoculations were made in 16 monkeys, none of which gave evidence of specific infection. It is interesting in this connection that material from two of the patients was found to be noninfectious despite the fact that on primary culture Bact. granulosis was isolated. The identity of one of these strains was verified not only in this laboratory, but also by Dr. P. K. Olitsky and Dr. I. A. Bengtson. In order to ascertain that lack of characteristic disease in the monkeys was not due to the resistance of the animals to infection, it was found necessary to reinoculate a number of the same animals with trachomatous tissues. It will be seen that 20 monkeys were subsequently inoculated with cultures from active material. Of this number, six received material which was unable to induce infection in normal control animals, while 14, on the other hand, were inoculated with tissues which induced follicles in previously unused animals, and of these, 13 presented typical infection. So, also, in six monkeys, originally inoculated with cultures isolated from noninfectious material, two were specifically infected when they received tissues containing the active agent. It is, therefore, obvious that lack of infection following inoculations of cultures is due not to the resistance of the animals, but actually to an inability of the cultures to induce the disease.

The possibility, then, that any of the organisms isolated from trachoma may singly, and therefore specifically, induce experimental trachoma has been studied without gaining substantiating evidence. That the organisms pooled, and therefore nonspecifically, might be involved in causing the experimental infection has also been eliminated. It remained, therefore, to determine whether the bacteria might be associated with some factor in inducing infection. Several experiments were undertaken in which Berkefeld filtrates obtained, by a method previously de-

Table 2

SUMMARY OF EXPERIMENTS ON INFECTIVITY OF BACTERIA ISOLATED FROM TRACHOMA

Source of cultures	Number of Inoculations	Monkeys		Monkeys Reinoculated with			
				Infectious Tissues		Noninfectious Tissues	
		Inoculated	Infected	Inoculated	Infected	Inoculated	Infected
From 16 tissues proved infectious	56	40	0	14	13	6	0
From 15 tissues proved noninfectious	22	16	0	2	2	4	0

scribed,[4] from active trachomatous tissues, were inoculated simultaneously with a number of cultures. It was very quickly determined, however, that active tissues do not contain a filterable agent which might supplement any of the bacteria studied in inducing experimental trachoma. In some of the experiments, Bact. granulosis was ininjected with the filtrates, and in others, unidentified gram-negative rods. This study was discontinued at this point, since the results already acquired did not warrant further experimentation with this possibility. The experiments with filtrates, however, lend further confirmation to a preceding study in which it was shown that in general the infectious agent of trachoma does not permeate Berkefeld filters.

Discussion

The consecutive studies conducted in this laboratory on the etiology of trachoma were originally undertaken on the principle that an approach to this complicated problem would be most constantly accessible through the process of elimination. On this basis, it was first determined, as others have demonstrated before, that trachoma is an infectious disease transmissible to monkeys with certain modifications. It then became possible to eliminate diet as a causative factor in the experimental infection when it was found that defective nutrition had no significant effect on the evolution of the disease. This conclusion receives confirmatory evidence from the recently published observations on humans by Rice, Sory, Smith, Faed, and Drake,[13] and by Tang.[14]

Progressively, experiments devised to determine filterability of the infectious agent of trachoma, in the sense that it passes through Berkefeld filters without great loss in infectivity, eliminated filtration as a method of further study. In this connection, it is important to point out that recent observations by Thygeson and Proctor,[15] and by Thygeson, Proctor, and Richards,[16] demonstrate that the agent of trachoma, while unable to penetrate through candle filters (kieselguhr, or porcelain), actually pervades Elford membranes (collodion). On the other hand, Stewart,[17] using similar conditions of filtration, concludes that the infectious agent of trachoma does not go through Elford filters, and Cattaneo[18] also found that ultrafiltration through collodion membranes deprives trachomatous tissues of infective activity.

In advancing the general investigation, the present study was devoted to the bacteria cultivable from trachoma. Numerous alterations in technique and culture media were employed without particular variations in results. The only organisms found with any constancy have been the different varieties of Staphylococcus and diphtheroids. A large number of bacteria, however, have been isolated, but with little frequency. A large number of gram-negative rods, in many respects resembling Bact. granulosis, were isolated. Further study revealed, however, that only five of these strains were Bact. granulosis, and the remaining were not identified despite a definite, concerted effort to classify them. The failure to observe any characteristic flora in trachoma has been commented upon by a number of authors.[19]

It was not possible to correlate the bacteria cultivated either with the stage of the disease or with the presence of epithelial-cell inclusions. However, it is evident from a parallel study made of the bacteria cultivable from folliculosis, inclusion blennorrhea, and chronic conjunctivitides of unknown etiology, that the bacteria isolated from trachoma are indistinguishable from those encountered in other eye conditions. Indeed, a comparative analysis of the data reveals an agreement in cultures of 98 percent between trachoma and the other diseases.

Experiments were conducted to establish the specific infectivity of the different organisms cultivated by inoculating eyes of monkeys with demonstrated susceptibility to the disease. The technique of inoculation was varied and the bacteria were inoculated singly and pooled as soon after isolation as possible. Yet the results are striking that in no instance has it been possible to induce the experimental infection by administration of the cultures, although the tissues from which the organisms

were derived were actively infectious. Further experiments disclosed that even when inoculated simultaneously with Berkefeld filtrates of infectious tissues, the cultures were found to be incapable of causing specific infection. The results of the present investigation, therefore, offer no evidence to support the concept that bacteria are involved in the causation of trachoma.

Summary and conclusions

1. A study has been made of the bacteria cultivable from trachoma and clinically similar diseases as well as from normal eyes.

2. The bacteria cultivable from trachoma are not typical of that infection since they are also recoverable in approximately similar frequency for other conditions of the eye.

3. While less numerous, the same bacteria may be isolated from the eyes of normal individuals.

4. The bacterial flora of trachoma does not vary with the different clinical stages of the disease nor with the presence of epithelial-cell inclusions.

5. Inoculation into susceptible monkeys of all the different varieties of cultures isolated, either individually or pooled, does not induce experimental trachoma even though the tissues from which the bacteria are derived are demonstrably infectious.

6. Filtrates of infectious trachomatous material when inoculated simultaneously with the organisms isolated exhibit no supplementary nor associated activity capable of rendering the organisms specifically infectious.

7. The observations made in the present study furnish no evidence, therefore, that any of the bacteria cultivable from trachoma induce the experimental disease in monkeys.

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LIPODYSTROPHIA PROGRESSIVA WITH OCULAR COMPLICATIONS

Further report

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SAINT LOUIS

This report continues and concludes the visual history of a patient with progressive lipodystrophia, whose condition was originally described before the American Ophthalmological Society in 1926. The ocular complications in this case were: right eye, corneal ulcer, pallor of the disc, the choroidal atrophy; left eye, complete clouding of the cornea, preventing any view of the fundus. The cilia were partly or completely absent on both sides. Operations to bring the eyeball forward and to cause the lids to recede resulted in corneal improvement bilaterally. In 1933, the vision in the right eye was still normal. In 1934, the patient applied for a pension for the blind. A leukoma on the cornea of the right eye had reduced vision to hand movements at one foot. There was very little movement in the left eye, and limited movement on the right side. The conjunctivae were passively congested and the scleras resembled marbles. Projection was still normal in each eye. This ocular pathology accompanied a progressive wasting away of the fatty tissue in the face, neck, and shoulders, the extremities being affected to a lesser degree. Read before the American Ophthalmological Society at Hot Springs, Virginia, June 5, 6, 7, 1935.

This case was first reported by Dr. Hiram K. Liggett and one of us (J. W. C.) at the meeting of this society in 1926. At that time the results of Dr. George Ives's laboratory examination and Dr. Liggett's findings showed a normal condition, except for a slight hyperthyroidism.

Progressive fat atrophy begins with the superficial fat of the face and extends to the neck and breasts and down as far as the waist. Any attempt to increase the weight may add fat to the buttocks and thighs, but rarely to the upper part of the body. The sucking pads of the cheeks disappear, a condition that does not occur in wasting diseases; for instance, in tuberculosis. The appearance of the patient's face was first described as "death-mask."

According to Sprunt, three theories concerning the etiology have been advanced: (1) that it is a disease of the nervous system—a trophic neurosis; (2) that it is an endocrine disturbance; (3) that it is a disease of the adipose tissue itself. None of these theories has quite satisfied us. We are inclined to agree with Dr. Leland B. Alford, who made our first neurologic examination, and with Dr. Andrew B. Jones, who furnished the last one published in this report—that an abiotrophy more nearly explains the condition. Most of these patients seem to be normal, the only symptom that appeared in a few being a slight hyperthyroidism.

The original history of the patient will be found in the Transactions of this Society of 1926, and in the Journal of the Missouri State Medical Association of June, 1927.

After Dr. Liggett and one of us (J. W. C.) had issued the report on this case, we sent the patient to Barnes Hospital, under the care of Dr. M. Hayward Post and Dr. Vilray P. Blair, in order to learn if something could not be done to advance the blind eye in the orbit, and thus bring the globe again into contact with the lids.

Abstract of Barnes Hospital record no. 14331

"Mrs. —— was first admitted to Barnes Hospital on February 14, 1928, and discharged on March 17, 1928. The diagnosis made at that time was ulcers of the cornea of each eye; hypotension; lipodystrophia progressiva. On February 16th, a plastic operation was done on the right orbit. On March 1st a second plastic was done on the same orbit. On admission, the right eye showed a corneal ulcer, 3 by 4 mm. in size, in the lower nasal quadrant. There was complete clouding of the left cornea, with a highly vascularized scar. The right disc showed definite pallor; the edges were blurred, due to some choroidal atrophy about the papilla. The fundus of the left eye could not be made out. Many cilia were absent from the lids of the right eye, and all

from those of the left. All teeth were absent. No tonsillar tissue was made out. The blood pressure was 115/55. It was noted that there was adequate adipose tissue up to the lower costal margin, and that there was slight pitting of the ankles on pressure.

"There was nothing of special interest in the history except chronic constipation. The patient had had one child only, who died shortly after birth. Delivery had been difficult. Following the birth of the child, she was confined to bed for six weeks. There had been no further pregnancies. Loss of weight began one year after the birth of the child, eighteen years previous to admission to the hospital. During those years the weight fell from 155 to 110. The eyes began to recede in 1920. Ulceration of the cornea of the right eye began six weeks before admission."

Fig. 1 (Charles and Post). Charles and Liggett's patient at 26 years.

To quote the record of Dr. Vilray P. Blair, who operated on the right eye under local anesthesia on February 16th: "Passed hypodermic needle along the upper and outer wall of the orbit deep into the orbit and injected fluid (normal saline) behind the globe. Globe moved forward about one-fourth inch. A good deal of fluid came out into the eyelids and considerable hemorrhage followed the injection." The practical result was a forward movement of the eye of one-fourth inch only. At the second operation on March 1st, Dr. Blair "cut the median palpebral ligament and also the palpebral fascia close

Fig. 2 (Charles and Post). Charles and Liggett's patient at 46 years.

to the lacrimal sac for about one-fourth inch above and below the ligament." He also "cut the lateral palpebral ligament externally through a transverse incision, and almost one-half inch of the attachment of the palpebral fascia above and below the ligament. This apparently allowed the lids to drop back somewhat." The operation was done in an effort to approximate the lids to the globe. A pressure dressing was applied. Following this procedure slow improvement took place. The ulcer of the cornea of the right eye healed, and clearing commenced in the cornea of the left eye above and to the nasal side. The patient was discharged from the hospital shortly afterward.

Laboratory findings during the patient's stay in the hospital were as follows: Urine clear; specific gravity

LIPODYSTROPHIA PROGRESSIVA WITH OCULAR COMPLICATIONS

Further report

J. W. Charles, M.D. and M. Hayward Post, M.D.
SAINT LOUIS

This report continues and concludes the visual history of a patient with progressive lipodystrophia, whose condition was originally described before the American Ophthalmological Society in 1926. The ocular complications in this case were: right eye, corneal ulcer, pallor of the disc, the choroidal atrophy; left eye, complete clouding of the cornea, preventing any view of the fundus. The cilia were partly or completely absent on both sides. Operations to bring the eyeball forward and to cause the lids to recede resulted in corneal improvement bilaterally. In 1933, the vision in the right eye was still normal. In 1934, the patient applied for a pension for the blind. A leukoma on the cornea of the right eye had reduced vision to hand movements at one foot. There was very little movement in the left eye, and limited movement on the right side. The conjunctivae were passively congested and the scleras resembled marbles. Projection was still normal in each eye. This ocular pathology accompanied a progressive wasting away of the fatty tissue in the face, neck, and shoulders, the extremities being affected to a lesser degree.
Read before the American Ophthalmological Society at Hot Springs, Virginia, June 5, 6, 7, 1935.

This case was first reported by Dr. Hiram K. Liggett and one of us (J. W. C.) at the meeting of this society in 1926. At that time the results of Dr. George Ives's laboratory examination and Dr. Liggett's findings showed a normal condition, except for a slight hyperthyroidism.

Progressive fat atrophy begins with the superficial fat of the face and extends to the neck and breasts and down as far as the waist. Any attempt to increase the weight may add fat to the buttocks and thighs, but rarely to the upper part of the body. The sucking pads of the cheeks disappear, a condition that does not occur in wasting diseases; for instance, in tuberculosis. The appearance of the patient's face was first described as "death-mask."

According to Sprunt, three theories concerning the etiology have been advanced: (1) that it is a disease of the nervous system—a trophic neurosis; (2) that it is an endocrine disturbance; (3) that it is a disease of the adipose tissue itself. None of these theories has quite satisfied us. We are inclined to agree with Dr. Leland B. Alford, who made our first neurologic examination, and with Dr. Andrew B. Jones, who furnished the last one published in this report—that an abiotrophy more nearly explains the condition. Most of these patients seem to be normal, the only symptom that appeared in a few being a slight hyperthyroidism.

The original history of the patient will be found in the Transactions of this Society of 1926, and in the Journal of the Missouri State Medical Association of June, 1927.

After Dr. Liggett and one of us (J. W. C.) had issued the report on this case, we sent the patient to Barnes Hospital, under the care of Dr. M. Hayward Post and Dr. Vilray P. Blair, in order to learn if something could not be done to advance the blind eye in the orbit, and thus bring the globe again into contact with the lids.

Abstract of Barnes Hospital record no. 14331

"Mrs. —— was first admitted to Barnes Hospital on February 14, 1928, and discharged on March 17, 1928. The diagnosis made at that time was ulcers of the cornea of each eye; hypotension; lipodystrophia progressiva. On February 16th, a plastic operation was done on the right orbit. On March 1st a second plastic was done on the same orbit. On admission, the right eye showed a corneal ulcer, 3 by 4 mm. in size, in the lower nasal quadrant. There was complete clouding of the left cornea, with a highly vascularized scar. The right disc showed definite pallor; the edges were blurred, due to some choroidal atrophy about the papilla. The fundus of the left eye could not be made out. Many cilia were absent from the lids of the right eye, and all

from those of the left. All teeth were absent. No tonsillar tissue was made out. The blood pressure was 115/55. It was noted that there was adequate adipose tissue up to the lower costal margin, and that there was slight pitting of the ankles on pressure.

"There was nothing of special interest in the history except chronic constipation. The patient had had one child only, who died shortly after birth. Delivery had been difficult. Following the birth of the child, she was confined to bed for six weeks. There had been no further pregnancies. Loss of weight began one year after the birth of the child, eighteen years previous to admission to the hospital. During those years the weight fell from 155 to 110. The eyes began to recede in 1920. Ulceration of the cornea of the right eye began six weeks before admission."

Fig. 1 (Charles and Post). Charles and Liggett's patient at 26 years.

To quote the record of Dr. Vilray P. Blair, who operated on the right eye under local anesthesia on February 16th: "Passed hypodermic needle along the upper and outer wall of the orbit deep into the orbit and injected fluid (normal saline) behind the globe. Globe moved forward about one-fourth inch. A good deal of fluid came out into the eyelids and considerable hemorrhage followed the injection." The practical result was a forward movement of the eye of one-fourth inch only. At the second operation on March 1st, Dr. Blair "cut the median palpebral ligament and also the palpebral fascia close

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Laboratory findings during the patient's stay in the hospital were as follows: Urine clear; specific gravity

varied from 1008 to 1020; sometimes alkaline, sometimes acid, in reaction. No albumin; no sugar. There were a few hyaline casts and an occasional white blood cell. There were many epithelial cells. No acetone and no guiaic reaction. The P.S.P. for the first hour was 40 percent. It was not taken for the

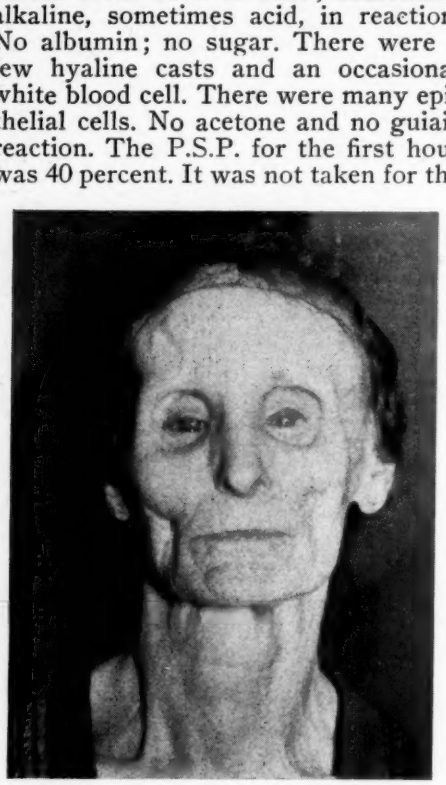

Fig. 3 (Charles and Post). The patient at the age of 54 years.

second hour. Blood examination showed red cells numbering from 4,880,000 to 5,450,000, and white cells from 5000 to 8700; hemoglobin, 90 percent. Wassermann and Kahn tests were negative.

The patient was readmitted to the hospital on March 27, 1928, and on April 11th a few adhesions of the lids to the left eyeball were broken. The upper and lower lids were sutured together, and a rubber drain was inserted. On May 16th she was discharged for the last time. The sutures had been removed, and the corneal condition was considerably improved. In 1933, the patient was exhibited before the American College of Surgeons, at which time the vision of the right eye was still normal.

In the fall of 1934, the patient was sent to Dr. Post with an application blank for a pension for the blind. Some months before, she had felt pain in the right eye and did not, as instructed, seek immediate relief. When seen by Dr. Post, there was a leukoma on the cornea of the right eye and her vision was reduced to hand movements at one foot. Projection was still normal in each eye. There was very little movement in the left globe, and limited movement on the right side. The conjunctivae were passively congested, and the scleras resembled marbles.

Dr. Liggett has furnished us the following report: "Mrs. —— was seen by me from November 19 to November 26, 1934, for a check-up after seven years' absence. I found her thinner than at my last examination, having reached a weight of 101 pounds, or a loss of ten pounds. The fat loss was more extensive about the head and neck than ever

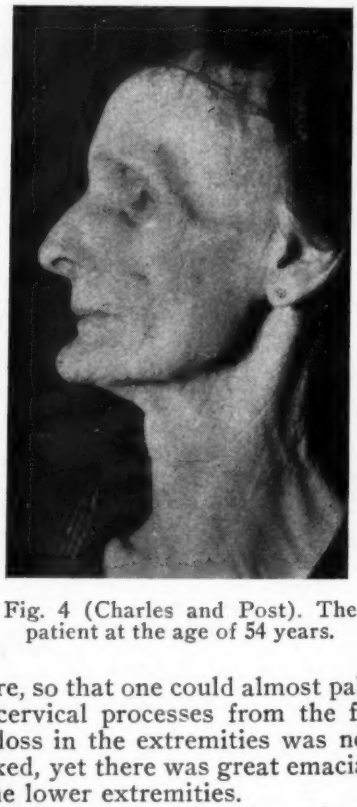

Fig. 4 (Charles and Post). The patient at the age of 54 years.

before, so that one could almost palpate the cervical processes from the front. Fat loss in the extremities was not so marked, yet there was great emaciation of the lower extremities.

"She felt well, although weaker—no infection of note. No constitutional symptoms. Her hair has fallen out

rather profusely during the last year. Her thyroid was distinctly larger than it was seven years ago, the circumference of the neck having grown from 29.5 cm. to 33.5 cm. despite the progressive loss of fat. Pulse, 92 (basal pulse, 72 to 80). Urine normal except for a faint trace of albumin. Basal metabolism was —10. Red blood count, 5,152,000 and white blood counts, 2006 and 3100 on different days. The differential showed 30 and 32 neutrophiles, respectively.

"There is possibly some hypothyroidism and the fat loss has been progressive in the upper part of the body. Her general organic condition seems good. The neutropenia is very interesting and is not accounted for, as she had no mucous-membrane infection that was demonstrable."

The neurologic examination was made by Dr. Andrew B. Jones, who reports that "the tendon jerks are present, equal, and active. The plantars are flexor in type. There is no gross change in sensation. The station and gait are altered only by her visual difficulties. The strength of the arms and legs is remarkably preserved. The most remarkable feature of the case is the seemingly total absence of tissue fats in the face, neck, shoulders, and upper thorax. This is true of the hands and forearms to a lesser degree. The condition is one of the abiotrophies."

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OPHTHALMIC ERRORS

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This paper outlines the personal qualifications needed to practice ophthalmology successfully, and the need for proper training in the field. It deals with errors in prescribing glasses, with errors in therapy, in surgery, and in prognosis, but does not lend itself to abstracting. Read before the Academy of Ophthalmology and Otolaryngology at Cincinnati, September 17, 1935.

A great deal of temerity is needed to approach this subject: we dislike to think of our own errors, though occasionally viewing those of our confrères with a certain amount of sympathetic satisfaction. I can only ask in excuse of the title that as the essayist has committed all the allowable errors and some of the inexcusable ones at various stages of his career, he may with this admission be pardoned if he points out the mote in the eye of his colleagues, admitting the beam in his own, willingly.

A certain number of us have made our first error in ophthalmology by becoming ophthalmologists in the first place: we were led into the field by practical expediency or fortuitous circumstance and have done our best. But if ever a field of medicine required especial aptitude, it is that of ophthalmology. Without a gentle and unusually dexterous hand, and preferably bimanual dexterity, many errors, and even, with the best intentions, repetitions of the same error occur. Unless there is a natural disinclination to interfere drastically in any happening, event, or course of proceeding there is likely to be too much meddling with too many drugs or instruments. If the temperament is too sanguine, too much reliance is placed on the spontaneous cure of cases, aided, perhaps, by one particular fetish of a medication, and then naturally not enough attention is given to meticulous examination, with perhaps microscopic evidence overlooked that would warn us of trouble to come. If one is of too pessimistic a turn of mind, not inclined to let natural healing processes alone, is unduly frightened by an occasional extra tear or injected vessel, adopting a new medication for every trivial change in the clinical picture, the eye may finally get well in spite of treatment, or refuse to because of constant well-intentioned but apprehensive meddling. If one lacks the quality of

making fine distinctions mentally between right and wrong, between moral and unmoral, between music and noise, between what is genuine in art or literature and what is hokus pokus—if, in other words, one has only the common good sensible practical head of the average highly competent individual, he is going to make many errors in our field —he then just does not possess that sensitivity of intellect needed, I believe, to appreciate properly the innumerable shadings of ocular disease. When we stop to realize that this finesse of judgment and the action based on it has to be built up on a generous base of general medical knowledge, we stop before the really great and nearly errorless of our profession, past and present, in humble admiration of their qualities as men and as scientists.

Errors due to insufficient training are perhaps the hardest to get rid of, due greatly to the fact that we do not know that we possess them. They are almost positive liabilities instead of negative factors. They occur again and again, followed always by the same bad results, and unfortunately what Jack has not learned as a boy, John will not acquire as a man. A violinist who has not learned the proper and convenient finger positions as a boy, as a man leaps about the strings in frenzied attempts to get notes into a certain space of time: so the man who has not acquired as an operator what the Germans call "Schule," is distinguished mainly by his lack of proper tempo. The operation is hurried in one detail, slowed up for another—each step looks as if *it* were the operation and not to be followed by another logical move—all is disjointed. It is a good deal like the pulling of a tooth in irregular hurried and spasmodic jerks. The door to grievous error is wide open. As a refractionist his lack of physiological knowledge makes him the slave of his complicated tools: his machinery dictates the prescription, instead of being only an accessory to his appreciation of the patient's particular needs, his age, mentality, working hours, and distance, his general physical well-being, past history in regard to glasses, and future plans in life. The reading prescription with the same eyes is different in the case of the well-fed dowager and the thin little professor of entomology. The commonest error of many of us, including my own, is the over correction of the presbyopic patient. We move him up too close in response to his demand for better near vision of small print, thereby increasing the effort at convergence, and fail to realize that as accommodation vanishes so the reciprocal innervation between convergence and accommodation, too, is disturbed, and convergence is now physiologically unwilling to be called upon too drastically.

Frequently we are distressed by the fact that our prescription as written is not what the glasses prove to be. There one may have committed the error, and how often it is a result of the "hurry" of our office, of not having centered the trial frame accurately and of not having measured and mentioned the distance between the posterior surface of the trial lens and the corneal vertex. In low degrees of correction it is of little consequence, but in any correction approaching or exceeding 4–5 D. it is of decided importance. Another common error is not to ascertain the P.P. and P.R. of each eye separately: occasionally there is a marked difference which not only has a bearing on the prescription but manifests a formerly unsuspected neurological condition. Our friend the myopic patient, usually free of subjective complaints except that of poor vision, must not be led into trouble: never correct a high myopia, not previously corrected, too abruptly. Workmen have fallen off roofs, and linesmen off power poles as a result. Sensitive people feel it a psychological insult to have the radius of their formerly rather restricted visual circumference increased tenfold, with mental reactions so far unused suddenly called into constant visual activity. We can obtain comfort and the necessary visual acuity, when needed, by giving one half to two thirds of the distance correction, and then add a monocular —5 or —10 to be used as a hook-on. Prof. Löhlein of Freiburg recently mentioned the case of a general practitioner with a myopia of 34 D., who could comfortably wear only a —20 and had

difficulty in finding the houses of his patients. With a monocle of —10 added for these occasions he could find the house number and could continue in practice comfortably. In cases of high hyperopia or aphakia with amblyopia, better vision can occasionally be obtained by holding a plus 10-D. lens about 10 cms. in front of the corrected eye, thereby through enlargement of the retinal image obtaining as high as twice the distance vision obtainable by the cataract glass alone. By monocular reading, so as not to exert convergence, and then by an appropriately strong convex glass to bring the print as close even as 10 cms., I have seen patients read J.1 who with their ordinary reading correction read only J.4. In some cases this enabled them to continue their life work. When combined with a music stand on which the book can be placed, so that it must not be held close or the head lowered, and with strong convex lenses with an appropriate prism, base in, comfortable reading can occasionally be obtained when all other means have failed.

It is an error to suppose that all headaches, like Caesar's division of all Gaul into three parts, are due either to the right eye, the left eye, or both eyes. Often the patient's money and our time are saved by speaking to the family physician after the first visit. The history is often illuminating in this regard: headaches occur, say, only with the periods; or only in the morning and are relieved by a cup of coffee and moving about; or only when stooping; or after a cold; or only after worry or psychical excitement, and so forth. With patients inclined to many complaints, and a wandering story, I have often prevented the error of false valuation of symptoms by saying, "Suppose I were a magician and simply by waving my hand could completely rid you of *one* complaint, which would you choose to be rid of?" It frequently works well.

In pointing out what seems to me a recurring error in therapy—though here, naturally, we are in the most empiric of fields, with so much play of prejudice, so many likes and dislikes, such conservatism, radicalism, or liberalism, and with so little to cling to scientifically, that the errors fairly bristle—may I speak of tuberculin and the errors it leads to? Not the giving of it primarily and not the question as to whether the process it is given for is tuberculosis in the first place, but the giving of it for long periods when the process is not improving, nay, in many instances, with vision becoming poorer? And yet I have repeatedly seen tuberculin kept up when, certainly, had we been dealing with any other drug or disease, we would have acted differently. Only recently such a patient put on iodides and a daily slight elevation of temperature by putting his arms into very hot water for fifteen minutes, improved, and remarkably so, for the first time in a year. Here, too, may be mentioned the error of looking forever for the etiology of, say, an exudative sluggish recurring iritis: out go all focal infections; the Wassermann is negative; and tuberculin is used and the patient appears at innumerable conferences and demonstrations. Meanwhile, it has not occurred to anyone to shorten the process, in many cases even to stop it, by an iridectomy done in a quiescent interval. Some of my most grateful results have been cases of this type, though to this day I do not know what the etiology was.

A very small selection of drugs will go a long way in ophthalmology. Hopping frantically from one to many will not get us very far. Individualizing in the percentage used of a small number of standard drugs is better. To illustrate with pilocarpine: I have seen a 2-percent solution hold tension below normal but be painful and interfere with vision; a 0.5-percent solution served this patient just as well and there were no complaints. Occasionally a regulation of tension can be secured with a 6- to 8-percent solution of pilocarpine when weaker solutions have failed.

A word regarding dionin. Some patients sneeze after its use. I was shown a patient who in so doing immediately noted poor vision, the result of fresh retinal hemorrhages. I have seen the same result after diathermy. Be careful then to instruct people with arterio-

sclerotic vessels and hypertension to press on the tear duct for some minutes after the use of dionin.

Ringer's solution has proved useful to me in a variety of corneal dystrophies. These patients often complain of "dry" eyes. One patient of mine could not and had not wept for years. She was seen in consultation by Professor Lindner, who sent her home to smell onions! When this did not work, to eat horse radish! This having failed, to drop Ringer's solution in her eyes very frequently, which resulted in greatly increased comfort. This leads me to believe that we are committing an error in not buffering solutions to the pH of the tears, in many cases; and while I have not yet done so, I will try it.

Personally, I consider it a waste of time, therefore an error, to use vaccine therapy in cases of staphylococcic blepharitis and the recurring forms of hordeolum. Success is certain here, if we inject novocaine along the hair roots, pull out all infected ones at one session, dip a toothpick in 1-percent silver nitrate and insert it in the infected openings, and then follow with two to three applications from the water-cooled quartz lamp. To consider every chronic, slight but annoying, conjunctivitis a sequence of bacterial infection is an error: a number are undoubtedly of allergic origin and the more they are treated, the worse they become. Do not forget the value of amyl-nitrite, used cautiously in older people, not only in severe cases of ophthalmic migraine, but in the atrophic stages of some cases of chorioretinitis, in pigmentary degeneration of the retina, and in arteriosclerotic atrophy of the optic nerve. Cordes and Horner have recently shown the value in toxic amblyopias of the use of vessel-dilating drugs, such as sodium nitrite. Finally, as regards therapeusis: please remember that we are playing a duet with our patient. We may be first fiddle, but if we are drowning out our second fiddle let us ease up on our treatment and give him time to recover from our too energetic tone: sometimes a pause for a few days helps the second fiddle enormously.

The field in which errors are most to be excused is perhaps that of glaucoma: excused to ourselves, at any rate, because after all we can say, "As long as I do not know why this eye is harder than normal I can only guess with a certain percentage in my favor as to what is wisest to do." Provided we employ common sense in estimating the age of the patient and expectancy of life, whether the disease is chronic with relatively low tension or acute with rather high tension, we have only one comparatively new method by which to avoid a good many of our former errors. I refer here to the curve of tension as ascertained by taking five or six tensions a day for several days, preferably with hospitalization, so as to obtain an even psychological background. This curve will show us the period, usually the morning, of the highest tension and the period of the lowest, when measured on the untreated eye, and will furnish us with the proper basis for the use of miotics and at what time they are to be administered. The curve is most useful when compared with the curve of the unaffected eye, if such there be. It also brings out one most important feature, and that is the normal tension for the particular individual, at least in cases in which a comparison between a normal eye and an affected eye is possible. After successful operation the taking of these curves every six months is to be advised. We see eyes slowly lose vision a year or two following an operation which at the time reduced pressure successfully. An occasional taking of the tension months or years afterward may not disclose a period of the day when the tension may have been nearly as high for a few hours as it was before operation. Let us not in referred cases from other specialists fall into the error of accepting their fields and their report of the tension as being representative of what that patient's tension and fields may be when we see them. I recently saw a patient well under pilocarpine who had traveled 24 hours previous to seeing me and carried with him a letter from his very competent eye specialist. This letter stated that the tension had never been more than 30 McLean. I took the tension to find it 90. When the patient

had recovered from the fatigue of the trip and the psychological excitement of seeing a new physician, it was 30. The difference in the measures, however, indicated that this case probably rested on a vasomotor basis and that the continuation of pilocarpine and a quiet life was preferable to an operation—especially as this patient's expectancy of life was not great. It is an error not to operate on the worse eye even though it be blind and painless. Valuable lessons can be learned as regards both patient and method of later operating on the one useful eye. Having said that errors in glaucoma are the most excusable among those we make, we need not pursue the subject further.

Cataract operations are a different story for the younger members of the profession today from what they were for those of my age when we started practice. Today sudden emergencies, with need for quick judgment, cases in which an error in judgment means loss of the eye, do not occur frequently. How well I remember uncontrollable sudden blepharospasm, ocular-muscle spasm, and sudden looking up, with the result that gaping wound and the operative field were under the upper lid. Here the lightning-quick operator and the man of many operations was in demand. The change is due to akinesis, retrobulbar injection, and superior-rectus suture. It is an error, and a grievous one, for anyone to operate today without using these measures with confidence. If you have not learned them, do so. If you won't use them, send your cataract patients to someone who will. It is an error to try every case as an intracupsular extraction. It is an error if when doing an intracapsular extraction you combine it with a total iridectomy. It is an error to excise or cauterize every iris prolapse: some can be replaced, others should be let alone. It is an error to believe that every focal infection in old people has to be removed before operating for cataract. It is an error to believe that perfectly normal light projection means a roughly normal fundus. I recently operated on an eye having normal tension with splendid projection and with the only indication of abnormality the fact that, according to the patient's statements, the cataract had matured in three months so rapidly that he was reduced from coarse reading vision to blindness. I found a total detachment of the retina, not due to the operation; for Dr. John Weeks, acting as consultant, had noted a beginning detachment over two years ago. For many good reasons the man had never been told and did not tell me that Dr. Weeks had any records of his case.

What of specific errors not uncommonly made, not in spite of highly technical equipment, but because of it? A common example is the use of the high-power objective of the slitlamp before a general survey has been made by means of good focal illumination and ordinary magnifying equipment. I once missed a tiny perforation of the iris as evidence of an intraocular foreign body. One has a highly magnified but small field and can miss seeing a portion of it altogether.

When operating for strabismus it is an error not to use the O'Connor cinch-shortening method in the cases in which shortening a muscle is indicated. Other operations are good; this is the best. In alternating cases, have the patient fix with each eye in alternation and close both eyes after fixation, repeating this several times. If, on opening both eyes, one eye fixes after it has received the last visual impression, and the other one does so not at all or less frequently, operate first on the eye that has not maintained fixation well. Frequently, if there is not too great a degree of strabismus, this is the only operation required.

Finally, a few observations without any particular logical relation to each other: Do not publish cases of interest too early. You may find a year after such publication that the case was not what you thought and did not in any way turn out as you described it. Be chary in giving a hopeless prognosis, not only from a psychological aspect but because, not infrequently, your patient, to his joy and your mortification, is seen a few years later with better sight than he had had for a long time. Do not in fundus examinations, no matter how diseased the fundus, think that

there is no use wasting time in seeing what glasses will do. I have had my competent associate give a patient 10/10 in spite of the fact that from one look at his fundus I would have sneered at the thought that a glass would be of any benefit. Do not make a prognosis to yourself as regards vision on only one method of examination. It is astonishing how different, for instance, a cataract will look when seen with the ophthalmoscope as compared with the view through the slitlamp. In one case you see no good reason for much depreciation in vision, in the other case, expect very low vision; and the vision may lie somewhere between these two extremes. Do not judge the future regarding vision by the atrophy of the optic nerve, especially in children. The prognosis looks poor and yet you see them often as adults with 20/30 vision. Do not be too hopeless about restoration of useful vision at sometime just because the fundus is acutely and severely affected. It is amazing to see what an amount of restoration to normal anatomy with normal vision can occur in marked choked disc and in marked fresh retinitis from practically any cause. Do not, because of typical star-shaped exudate in the macula, speak of nephritic or hypertension retinitis. I have seen this star-shaped exudate in brain tumor. Similar cases are mentioned in ophthalmic literature. While it is wise and proper to be skeptical, at least, regarding the cure by Christian Science of what is clinically undoubtedly melanosarcoma of the choroid, do not forget that there are definite cases on record, substantiated by excellent men, of the self-healing of cases of sympathetic ophthalmia, tuberculosis, cataract, and so forth, and that it is never wise to say this or that cannot occur.

The loss of patients due to errors on our part can in many cases be avoided by analyzing our training and disposition, by regulating the amount of work we can do carefully, by refusing to be hurried, and by always considering ourselves as students and not finished masters of our subject. Some loss in practice of course is beyond our control. A patient of mine went to one of my confrères for a cataract operation and told him that she wanted him to operate on her cataract because a friend of hers had had her eye successfully removed by him. It is a human and humorous reasoning process and much as we may learn to control ourselves, we cannot control our patients' cerebrating processes.

The value of this paper has undoubtedly been greater for me than for you. As I wrote it the number of errors I commit rose up before me like a well-martialed army, too many to mention in this paper. But it has made me conscious of my faults, and that is helpful. If in reading this paper it brings all of your errors before you, it perhaps has served its purpose.

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THE RELATION OF ACCOMMODATION TO THE SUPPRESSION OF VISION IN ONE EYE

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The present work is a continuation of that undertaken by McDougall and represents an attempt further to differentiate the factors involved in the voluntary suppression of vision in one eye. The rate of rivalry between afterimages induced in the two eyes, and between images produced by direct stimulation, can be affected by changes in accommodation. These effects can be obliterated by paralyzing the ciliary muscles with homatropine or by using a small artificial pupil which minimizes the effect upon the blurredness of the retinal image. From the Department of Ophthalmology, Oscar Johnson Institute, Washington University.

This investigation was made possible by a grant from the American Academy of Ophthalmology and Otolaryngology.

The present paper deals with a continuation of the type of work undertaken by McDougall in 1903.[1] McDougall showed that if one of the eyes is paralyzed with atropine, the ability to favor one of the monocular impressions in binocular rivalry is partially lost. This type of work was resumed by W. R. George and the writer while they were working together under Professor McDougall's supervision in 1932, and to Dr. George belongs the credit for a considerable amount of the preliminary work which forms the basis for the present paper.

The difficulty lies not so much in demonstrating that accommodation provides the basis for the voluntary suppression of vision in one eye, or the favoring of vision in the other, but in determining the exact manner in which this effect is accomplished. It might be produced in three ways: (1) through changes in the blurredness of the optical image, (2) through changes in intraocular pressure, and (3) through facilitating or inhibitory effects produced by proprioceptive impulses from the accommodation muscles upon the impressions from the retinae.

The use of afterimages instead of images produced by direct stimulation presents a situation in which optical blurredness is not involved. Under these conditions one is still able to retard or accelerate the rate of alternations between the dextrocular and sinistrocular impressions, as is demonstrated by the following experiment: The subject fixated the center of a bright horizontal bar (1″ x 3″) in a dark field with the right eye for 20 sec. and after a lapse of 10 sec. fixated the center of a vertical bar with the left eye for 20 sec. The positive afterimages were observed in complete darkness, the dextrocular and sinistrocular impressions appearing alternately. These fluctuations were recorded on a kymograph drum by letting the subject press a key controlling a signal marker. Six separate observations were made with the eyes normal, the subject trying to retard and accelerate the rate of fluctuations in alternate observations.* The eyes were then paralyzed with homatropine and six similar observations were made. The results are given in table 1. Each value represents an average for three one-minute periods of observations. The bright bars used to induce the

Table 1.

SHOWING THE EFFECT OF THE VOLUNTARY CONTROL OF ATTENTION UPON THE RATE OF ALTERNATION BETWEEN MONOCULAR IMPRESSIONS PRODUCED BY AFTERIMAGES IN THE TWO EYES. (ALTERNATIONS PER MIN.)

Eyes Normal		Eyes Paralyzed.	
Attempted Acceleration	Attempted Retardation	Attempted Acceleration	Attempted Retardation
23 ± 2.66	13 ± .66	15.4 ± 1.8	13.4 ± .8

* In trying to prolong the visibility phase of one eye the subject tries to concentrate his attention on the impression which is visible at the moment, but if he wants to make it disappear and bring on the other impression, he tries to imagine the other impression.

afterimages had a brightness of 3600 c. per sq. ft.,[2] and were observed through ficial pupils 2.33 mm. in diameter.

As the tabulated results show, one can by voluntarily controlling his attention change the rate of alternations from 13 to 23 per minute, but this effect is practically abolished when the eyes are paralyzed.

Although the use of afterimages rules out optical blurredness, the above experiment does not differentiate between the parts played by changes in intraocular pressure and proprioceptive impulses. In order to demonstrate that changes in intraocular pressure alone are capable of changing the rate of alternations, the following experiment was performed. Afterimages of horizontal and vertical bars were used as in the previous experiment and the eyes were paralyzed. By pressing on the closed eyelid of the left eye with the fingers when the image of the right eye appeared, one could make the image of the right eye quickly give way to the image of the left. The appearance of the right-eye image could then be made to reappear by pressing on the right eye. In this way a rate of about 26 alternations per minute could be obtained. When, however, one pressed on the right eye when the right-eye image was present, and on the left eye when its image was present one could retard the rate to 14 alternations per minute.

Afterimages differ from primary images in this respect, that they periodically disappear even when observed with one eye. For example, if an afterimage similar to those used in the above experiments is induced in one eye only, every 8 or 10 seconds it will disappear for a short period of about 2 to 4 seconds. Fry and Robertson[3] have shown that these disappearances depend upon the obliteration of the impression at the retinal level and that by controlling his attention one can increase or decrease the frequency of these disappearances when the eyes are normal, but not if the eyes are paralyzed with homatropine. To what extent the binocular rivalry is affected by the periodic obliteration of the impressions at the retinal level has not been carefully investigated, but the facts are plentiful enough to make one suspect that the changes in intraocular pressure produce their primary effect upon the periodic obliteration of the impressions at the retinal level, and that this in turn affects the rate of alternation in binocular rivalry.

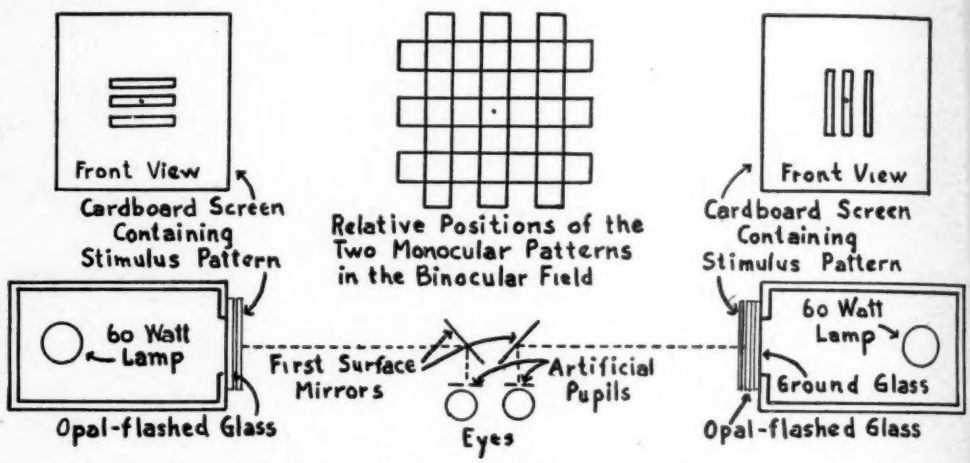

Fig. 1 (Fry). Apparatus for investigating the binocular rivalry of bars crossing each other. The images of the two stimulus patterns are seen reflected in the two first surface mirrors. The dots in the center bars serve as fixation marks and the mirrors are adjusted to compensate phoria. The bars are 1¾ in. long, one-fourth in. wide, and one-fourth in. apart. The stimulus patterns are 13 in. from the mirrors, and the mirrors 2.5 in. from the corneas.

Even in the case of impressions produced by direct stimulation, if an object differs only slightly in brightness from its background, the retinal impression will be obliterated periodically. But the difference can be made great enough so that the retinal impression will be stable, and periodic obliterations at the retinal level cannot be involved in the alternations in binocular rivalry.

Although changes in intraocular pressure affect the binocular rivalry of afterimages, this factor can be demonstrated to play little or no rôle in the suppression of vision in the case of impressions produced by direct stimulation. For investigating the rivalry of impressions produced by direct stimulation, the apparatus in figure 1 was used, which makes it possible to present a group of three horizontal bright bars in a dark field to the left eye, and a similar group of vertical bars to the right eye. The brightness of the bars was set at .75c. per sq. ft. The two groups of bars are seen alternately, and a record of the alternations for one-minute periods can be made on a kymograph drum. With the eyes normal and artificial pupils 3.94 mm.* in diameter placed before them, records for six separate observation periods were obtained. In alternate observations the subject attempted to accelerate and retard the rate of fluctuations. Six similar records were obtained with normal eyes and artificial pupils 2.06 mm. in diameter, and six other records were obtained with the eyes paralyzed and artificial pupils 3.94 mm. in diameter. The results are shown in table 2.

Although one is able to change the rate of alternations from 48.6 per minute to 28.4 per minute when the artificial pupils have a diameter of 3.94 mm., this ability is almost completely abolished when the pupil diameters are reduced to 2.06 mm. The most plausible explanation for this is that the small artificial pupil prevents changes in accommodation from producing marked effects upon the blurredness of the optical image, but it does not interfere with the changes in intraocular pressure or the proprioceptive impulses, so that it cannot be assumed that these factors play an essential rôle. As can be seen in the tabulated results, the ability to change the rate of alternations is also abolished to a large extent by the use of homatropine.

Table 2

SHOWING THE EFFECT OF THE VOLUNTARY CONTROL OF ATTENTION UPON THE RATE OF ALTERNATIO BETWEEN MONOCULAR IMPRESSIONS PRODUCED BY DIRECT STIMULATION OF THE TWO EYES (ALTERNATIONS PER MINUTE)

Eyes Normal				Eyes Paralyzed	
Art. Pupil 3.94 mm. in Diameter		Art. Pupil 2.06 mm. in Diameter		Art. Pupil 2.06 mm. in Diameter	
Attempted Acceleration	Attempted Retardation	Attempted Acceleration	Attempted Retardation	Attempted Acceleration	Attempted Retardation
48.6±4.8	28.4±2.8	42.6±7.8	39.6±.4	45.4±.8	40±2

Summary and conclusions

The voluntary suppression or favoring of vision in one eye has been demonstrated to be mediated through changes in accommodation by showing that the voluntary control is abolished by paralyzing the ciliary muscles with homatropine. In the case of afterimages the control is brought about through changes in intraocular pressure because optical blurredness is not involved, and because it can be shown that applying pressure to one of the eyes causes the impression of that eye to predominate over that of the other eye. In the case

*Under the conditions of the experiment the size of the natural pupil is about 5 mm. in diameter by actual measurement.

of the rivalry of impressions produced by direct stimulation, the voluntary control is mediated through changes in the blurredness of the optical image, because voluntary control is abolished by use of a small artificial pupil, which minimizes the effects of changes in accommodation upon optical blurredness but does not interfere with proprioceptive impulses or changes in intraocular pressure.

The demonstration that the voluntary suppression or favoring of vision in one eye is mediated through the ciliary muscles is of theoretical importance because Helmholtz[3] used this phenomenon as evidence against Müller's doctrine that paths from corresponding points of the two retinae converge upon common cerebral pathways. He believed that the paths from corresponding points of the two eyes remain separate up to the point to which consciousness is adjunct and that the integration of the two monocular impressions is a psychic affair, and the suppression of one of the impressions is simply a matter of the mind's ignoring it. Now if the voluntary control is effected through peripheral mechanisms, this vitiates Helmholtz's objection to the doctrine of common cerebral centers.

The discovery of the particular mechanisms involved in the voluntary suppression of vision and of methods for controlling suppression should be of practical importance in the treatment of squint, but procedures utilizing this knowledge have not as yet been worked out.

The demonstration that voluntary control of binocular rivalry can be abolished by such means as mydriatics and artificial pupils is of practical importance to those who are interested in the investigation of binocular phenomena, because if proper precautions are taken they need no longer fear that uncontrolled changes of attention will lead to spurious results.

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THE NONSURGICAL TREATMENT OF NONPARALYTIC STRABISMUS

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This presentation is based on a study of cases of strabismus with and without amblyopia and cases of amblyopia without strabismus. Emphasis in treatment is placed on the general health especially in early cases. The difference between the presence of a fusion faculty and the demonstration of good fusional activity is emphasized. The value of equal ocular efficiency is stressed. The question of the relation of the error of refraction to the incidence and treatment of strabismus is discussed. Minimal errors of refraction are tentatively submitted, below which prescription for the effect on the strabismus is of very questionable value. No attempt is made to give statistics of successes and failures, but only to inquire into the probable causes therefor. Read before the Eye, Ear, Nose and Throat Section of the California Medical Association at the sixty-fourth annual session at Yosemite National Park, May 13-16, 1935.

This paper presents the results obtained from analyzing the records of 66 cases of nonparalytic strabismus without ocular pathology, 23 cases of nonparalytic strabismus with ocular pathology, and 200 nonpathologic cases of unilateral and bilateral amblyopia without strabismus. Twenty-one of the strabismic cases were seen during the past year at the White Memorial Hospital Eye Clinic. The remaining 268 cases were seen in private practice during the past three years. In this presentation it is not intended to give the statistics of successes and failures, but to inquire into the probable causes therefor.

Most reports on this subject present the results of nonsurgical therapy in percentages based on those cases, and only those cases, which have satisfied the particular author's requirements as to the period of treatment. In the recent reports by Guibor[1, 2] and Feldman,[3] one finds that at least an equally large number of patients have failed to continue the treatment more than several weeks or several months. These cases are not considered in the final percentages, despite the fact that a great number of them should be considered as failures. It is probably a lack of material improvement in their condition which led to the discontinuance of the treatment in many instances. If all patients who start treatment are considered, the percentages of good results would be much lower than those usually given. That all cases should be included will be argued by those who obtain prompt signs of improvement, while those who set 6, 12, or more months as arbitrary periods of required treatment will naturally object.

It is desired here to point out that the failures may be due to the indiscriminate application of a standardized mode of treatment to cases of all types. It is hoped that a clearer understanding of the specific requirements in each case and the application of the particular therapeutic measure or measures indicated may lead to better and more prompt results with the minimum of fruitless effort. The essential factors to be briefly considered here are not new. The aim is only to emphasize a more rational viewpoint.

I. General health

While the general health is considered of considerable importance by many authors, few clinicians accord this subject the primary position it seems to deserve. Disturbances of the general health are, in the writer's opinion, not only of primary importance in inciting a strabismus in early life, but may cause recurrences or prevent a good response to therapeutic measures. Only recently, several authors have called attention to the close relationship between the general health and the strabismus (Feldman,[3] Pugh,[4] Dor,[5] and Csapody-Mocsy.)[6] It is desired here to report briefly three cases which further illustrate the importance of the health factor in the treatment as well as in the etiology.

In all cases presented cycloplegic tests were made. The angles of squint as given were determined for distance

fixation in the primary position. The angle Gamma was considered in each case. A squint was considered intermittent if the history so stated or if single binocular fixation was noted at some time during the examination (first three visits). A squint was considered alternating in type if with eyes open, fixation could be maintained with either eye, even if preference for one eye existed.* Worth's classification of fusion was followed, as no reason could be found for a change. Type-I fusion refers to the finding of simultaneous binocular vision (diplopia). This was found in every nonpathologic case of strabismus examined, although frequently with special aids, and is in agreement with Maddox[7] who believed that an absent fusion faculty is rarely found. Type-II fusion refers to the finding of ability to blend images. Type-III fusion refers to the ability to obtain stereopsis and to maintain it under varying conditions (amplitude).

Case 1. A. H., a male, aged 10 years, had had intermittent alternating divergent strabismus varying in amount up to 35 degrees since he was one year of age. R.V. w + 0.50 D. cyl. ax. 90° = 1.0; L.V. w + 0.25 D.sph. ⊂⊃ + 0.50 D. cyl. ax. 90° = 1.0. Type-III fusion was present. The family history was negative for strabismus. The mother had interstitial keratitis. This patient had been a premature baby. *Taenia saginata*, considered to be at least three years old, was recovered from the intestines. Following the removal of the parasite the eyes immediately began to improve, and the patient gained seven to nine pounds. Two weeks after recovery of the tapeworm the "eyes turned only occasionally." Divergence was rare thereafter and when the patient was seen almost five months later no squint had been present for at least two months. No glasses nor fusion treatments had been given this patient. In all, the fusion sense had been examined six times and was found present at all times. This case could be considered also (as it no doubt is) as an example of surrender of convergence effort. It is not desired here to discuss the relation of convergence and strabismus.

Case 2. M. K., a female, aged 3¼ years, had had intermittent convergent strabismus, almost always of the right eye, during the past year and one-half. While it had not been observed after a tonsillectomy six months before examination, it had again become noticeable during the past four to six weeks. Convergence was found to be present under cover. R.V. w + 3.00 D. sph. ⊂⊃ + 0.25 D. cyl. ax. 90° = 0.3; L.V. w. + 3.00 D. sph. ⊂⊃ + 0.25 D. cyl. ax. 90° = 0.5. (Vision was probably better but the patient's attention was not sustained.) Type-II fusion was definitely present, probably Type III also, but coöperation was still insufficient to allow of making definite statement. The patient was definitely listless. Physical and laboratory examinations by a pediatrician revealed only a slightly subnormal hemoglobin (75 percent). The mother reported that the child ate less than one third of the prescribed diet. This defect was remedied to a great extent and with a prompt decrease in the appearance of the strabismus. The mother kept a record of the number of times per week a squint was noticed. Following improvement in food intake the record showed a definite decrease. In the fourth month the strabismus was rarely noted. The hemoglobin was then 85 percent.

The minor part that fusion played in these cases is evident from the response obtained without fusion therapy. While glasses may justly have been prescribed in this second case, they were withheld to permit demonstration of the greater importance of the general health.

Case 3 emphasized the health factor even more as in it we have a relatively "young," normally active fusion faculty in which the condition was well known before the onset of the strabismus.

Case 3. B. S., a female, aged 13 years, had had alternating convergent strabis-

* Since such cases showed equal or almost equal visual acuity in the two eyes, and fixation with each eye could be maintained, it was considered probable that alternation was at times present.

mus of 30 degrees since the age of 2½ years. Glasses had been worn since she was 5½ years of age, and orthoptic training was given soon after for one year without effect. Only Type-I fusion was demonstrated before the operation, but eight days after the operation, when the patient had been 24 hours without a bandage, Type-III fusion was easily elicited. R.V. w + 0.75 D.sph. ⊂⊃ + 1.25 D. cyl. ax. 30° = 0.8; L.V. w + 1.00 D. sph. ⊂⊃ + 0.25 D. cyl. ax. 90° = 0.8. It was thought that glasses were not vitally important, so they were not prescribed. Fusion exercises were given at home and at the office to help in the development of the "young" fusion sense. Six months passed without any evidence of strabismus. Then, following an attack of influenza, a right convergence became evident. The patient was seen three weeks after the onset. After three more weeks, during which fusion was more intensively stimulated (or convalescence became complete), the squint promptly disappeared, and the eyes functioned normally at least six months later. Type-III fusion was easily elicited during the period when the temporary squint was manifest.

In this case the prompt disappearance of Type-III fusion within 24 hours after surgery suggests that this type of fusion was present before but could not function, that is, could not be clinically demonstrated because of the inability to get similar images on corresponding points. The fact that Type-III fusion was elicited by a special test during the period of convergence of the right eye following the attack of influenza shows, too, that the strabismus was not due to a lack of fusion sense but to a lack of energy to *maintain* this function. This case suggests that although fusion by tests may be normal, yet the length of time this cerebration process has been active determines the readiness with which it may be surrendered when the general health (and energy sources) suffer. That more attention should be paid to stories of general-health disturbances is strongly suggested by the relapse occurring in this case following influenza. The prophylactic value of stimulating the fusion function during the convalescent period is self-evident. The likelihood of avoiding such complications as amblyopia and abnormal muscle responses would be increased. Avoidance of physical or mental excesses would no doubt be helpful during this period.

A study of 10 cases of intermittent strabismus showed that a disturbance of the general health was found in five of these despite the long duration of the condition. When the health was improved the strabismus disappeared. However, one is not usually fortunate enough to find a health factor present after the strabismus has existed for several months or more.

II. Error of refraction

Since Donder's emphasis on the relation between the error of refraction and strabismus, it has been customary to prescribe glasses at an early age without sufficient regard to their frequent lack of effect. The psychologic problem introduced for the patient and the parents by this procedure has been entirely disregarded. As little as one or two diopters of hyperopia are frequently corrected in strabismic children. No consideration is given to the relative unimportance of this small amount of hyperopia to the amount of accommodation available. Little attention is paid to the lack of organic relation between accommodation and convergence, and to the ease with which these functionally related acts may be dissociated. No justification for this procedure has ever been presented. The statistics of cures with glasses alone do not furnish the data necessary to determine the minimal limits of refractive errors which may be ignored in caring for the strabismic patient (Guibor and others). The idea that in the early period of the strabismus, or even before its onset, a small factor may turn the balance against the strabismus seems sound and, on the basis of this idea, apparently justifies prescribing for small degrees of hyperopia. This reasoning fails to consider the aforementioned lack of importance of the small amount of hyperopia to the amount of accommodation available, as well as the usually

small amount of time spent in exacting close work in these young individuals. The aforementioned lack of organic relation between accommodation and convergence as well as the ease with which these functions may be dissociated are further arguments against the idea presented. Those who believe in prescribing for small amounts of hyperopia in treating strabismus have yet to produce clinical support for this belief.*

In a study of unilateral and bilateral amblyopia with and without strabismus, recently reported upon by the writer,[8] it was suggested that when the error of refraction is high, correction by accommodation is not easily tolerated. Following the neurologic principle that an intolerable function is usually surrendered, accommodation in these cases does not counterbalance the error of refraction; hence, later on, these patients show a lack of visual development—a subnormal corrected acuity of vision, definitely related to the high error of refraction. The relation of these errors to the strabismus that may be present cannot, therefore, be considered due to any accommodation-convergence link. Zentmayer's[9] studies of refraction in convergent strabismus show an increased incidence of high errors of refraction in strabismus as compared to the findings in nonstrabismic cases. His statistics suggest that patients with high errors of refraction are more prone to have strabismus. In view of the above-mentioned findings in amblyopia and in strabismus, it seems reasonable to presume that the relatively greater frequency of strabismus in cases with high errors of refraction may be directly related to the decreased visual efficiency. It is tentatively suggested, therefore, that the following errors of refraction be given consideration in the treatment of strabismus: (1) hyperopia of 3.00 diopters or more; (2) astigmatism of 1.50 diopters or more; (3) anisometropia of at least 2.00 diopters.

Of nine patients cured by glasses alone, none had an error of refraction *less* than the minimal figures just given.*

This article is not concerned with the relation of the size of the squint angle to the response to therapy, although it cannot be denied that this is a probable factor. Cases responding to correction of refraction alone have shown a wide variation in the size of the squint angle, but too few data are at hand to justify a definite statement on this point.

The type of case requiring correction of the error of refraction is well illustrated in the following cases:

Case 4. H. L., a male, aged seven years, had alternating convergence varying from 10-35 degrees. Onset was at the age of three years following a fright. R.V. w + 5.50 D. sph. ⊂⊃ + 0.50 D. cyl. ax. 180° = 1.0—. L.V. w + 5.50 D. sph. ⊂⊃ + 0.50 D. cyl. ax. 90° = 1.0. The eyes were straight at once with glasses. Four months later, the first test for fusion showed the presence of Type III. The eyes now are sometimes straight without glasses.

Case 5. H. D., a female, aged six years, had a left convergence of 15 degrees since the age of four years. R.V. w + 5.00 D. sph. = 0.6. L.V. w +4.50 D. sph. ⊂⊃ + 1.00 D. cyl. ax. 110° = 0.2. The left convergence was less under atropine. The eyes were straight with glasses when seen one month later. Ten months later, the eyes were still straight with glasses, although there was a tendency to alternate convergence without correction. Corrected, the vision O.U. = 0.6—.

Case 6. W. M., a male, aged 4½ years had had a left intermittent convergence for the past two years. The angle of squint varied up to 20 degrees. R.V. w + 4.50 D. sph. ⊂⊃ + 1.50 D. cyl. ax. 110° = 0.3? L.V. w + 5.00 D. sph. ⊂⊃ + 1.50 D. cyl. ax. 70° = 0.3—? The eyes were straight under atropine, and had remained straight with glasses

* Since presentation of this paper the excellent paper by A. M. Hicks and G. N. Hosford appeared (Orthoptic treatment of squint, Arch. of Ophth., 1935, v. 13, June, p. 1026). In this they, too, emphasize the limitations of orthoptic training. Of 24 cases, the only five in which the eyes were straight following orthoptic training were straight with glasses only. These showed an error of refraction of at least 3.00 diopters of hyperopia.

when last heard of, eight months later.

When high errors are corrected without materially influencing the strabismus it will be found that visual and muscle or innervational complications have already developed. This is illustrated by the following two cases:

Case 7. E. H., a female, aged 26 years, had had a left convergence since her third year following illness with convulsions. Glasses were worn at five years. Although there had been some spontaneous improvement in the strabismus since she was 12 years old (seven years after starting to wear glasses), 5-25 degrees of left convergence (variable) was still present at the examination. R.V. w. +2.00 D. sph. ⊂⊃ + 1.50 D. cyl. ax. 90° = 0.8. L.V. w. + 1.50 D. sph. ⊂⊃ 3.50 D. cyl. ax. 90° = 0.2—1. Only Type-I fusion was demonstrable. A large left central scotoma almost reaching the fixation point was present. The results might have been different had the glasses been prescribed promptly when the squint first manifested itself.

Case 8. J. H., a male, aged seven years, had a left convergence (45 degrees) present since the age of two years, following several serious falls. He was given two years of orthoptic exercises, including occlusion of the right eye and drawing with the left eye. R.V. w. +4.50 D. sph. = 0.8 +3. L.V. w. + 4.25 D. sph. ⊂⊃ + 1.00 D. cyl. ax. 80° = 0.4 — 1. Glasses were without effect on the squint. Only Type-I fusion was demonstrable. The squint angle at times was only 20 degrees. The patient did not coöperate well. An operation was performed. On the ninth postoperative day, after 24 hours without bandages, Type-III fusion was found to be present. Glasses were ordered equalizing the right and left vision. Fusion treatment could not be effectively given. Glasses had not been given until the strabismus had been present one year. No treatment of moderately thinned, stretched external recti (as found at operation) had been instituted. It is possible that if glasses had been prescribed promptly the left subnormal vision would have been avoided and the muscles would have maintained functionally equal development.

III. Unequal visual efficiency

If the retinal images are different in size or clarity in the two eyes, whatever the cause, it cannot be expected that the two eyes will function normally together. Normal fusional activity depends on the presence of markedly similar images of the same object in the two eyes. This was recently emphasized by Little's[10] case of unilateral aphakia with divergent strabismus, which was corrected by a contact glass. Duane,[11] in 1899, Deloge,[12] in 1921, and Blatt,[13] in 1932, also reported correction of strabismus by better equalization of vision in cases of marked anisometropia. The recent work of Ames[14] and his co-workers calls fresh attention to the importance of balancing the lenses before the eyes so that the two macular images are more nearly equal. The question which he has raised of an actual retinal asymmetry is far from settled. A discussion of this phase of the subject is not essential to this paper.

When the inequality in visual efficiency is not fully explained by the anisometropia that may be present, the condition (the unilateral amblyopia) is due to the strabismus—is one of its sequelae. This should receive consideration before an attempt at fusion therapy is made, for any fusional activity that may be developed in the presence of amblyopia is abnormal and may not be maintained. It is probably this factor that accounts for a decrease in Guibor's[2] good results with time. Feldman[3] required 20/70 vision in the poorer eye before commencing fusion treatment.

IV. Muscles

Dunnington[15] called attention to the finding at operation of thinned, stretched, or atrophic muscles. Contractures, too, may be found present in cases of strabismus. While many cases do not show such changes grossly, the inequality in functional activity should reasonably be expected to produce certain changes in the muscles involved. While abnormal fusion effort may indirectly help overcome this

muscle defect, a prolonged period will usually be required. The *exercise* of the fusion faculty that this involves should not be confused with *fusion treatment.* Cases 3 and 4 show that the fusion faculty needs little, if any, treatment when the muscle imbalance is corrected by surgery. Others have reported similar findings (Goar[16]).

Direct therapy aiming at the development of a more normal equilibrium of muscle power may possibly bring about prompt results without surgery. Such therapy may be along the lines of electrical stimulation of the weaker muscles, such as is given for muscles elsewhere in the body. Until this is done, however, one must consider nonsurgical treatment of this complication as a prolonged form of therapy.

V. Fusion

Peter[17] said that fusion training may be a simple matter; that in many instances little is necessary, if the subnormal visual and suppression barriers are removed. Such an observation plus the excellent results without fusion therapy which usually follow the surgical correction of cases of alternating strabismus (case 3) and cases of unilateral strabismus with fair vision in the squinting eye (case 8) definitely force the statement that fusion is potentially present in most if not all cases of strabismus, awaiting only favorable conditions for functioning. A prolonged period of fusion treatment should suggest attention to the factors which make fusion activity difficult. The specific treatment of fusion may be deferred until these deterring factors are removed.

These deterring factors are unequal visual efficiency or muscular defects preventing normal coördinating activity of the eyes. When the inequality in vision is due to amblyopia *following* the strabismus, the treatment will be most prolonged unless this factor is corrected early in life. When muscular changes have taken place (actually in the muscles or in the innervation) the treatment by nonsurgical means should be directed *towards the muscles,* and *not towards the fusion faculty.* In the absence of a visual deterrent, if the response to "fusion tests" improves promptly (within six to eight weeks), one can say that the muscle condition is not a marked deterring factor. A period of fusion treatment may be found helpful in old cases properly prepared therefor, and in recent cases which may benefit from extra stimulation. Such cases should show prompt "improvement" as evidenced by a greater ease in demonstrating Worth's Type-II or -III fusion.

Summary and conclusions

1. A few cases have been presented to demonstrate the value of the general health as a factor in the treatment of nonparalytic strabismus.

2. The importance of high errors of refraction and of definitely unequal ocular efficiency in determining the treatment of the condition was emphasized. Tentative minimal errors that should be corrected were given as 3.00 diopters of hyperopia, 1.50 diopters of astigmatism, and 2.00 diopters of anisometropia.

3. It was pointed out that the fusion faculty is probably potentially present in all cases of strabismus (at least simultaneous binocular vision Type-I fusion is demonstrable in practically all nonpathologic cases). It requires but a relatively short period of treatment for full expression if the deterring factors are first removed. It was suggested that fusion treatment may be relatively fruitless if these factors of inequality of visual efficiency and abnormal muscle responses are not first removed.

4. Indications are given for determining at the start whether or not nonsurgical therapy will be prolonged.

5. The question is raised whether it is psychologically sound to undertake a prolonged period of nonsurgical therapy alone in certain cases when with surgery prompt results may be obtained (footnote, p. 142).

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MANAGEMENT OF COMPLICATIONS IN THE OPERATION FOR SENILE CATARACT

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This paper gives a brief discussion of such operative complications as prolapse of vitreous, hemorrhage, and infection; also postoperative glaucoma, iris prolapse, retinal detachment, and sympathetic ophthalmia together with various suggestions for the inexperienced ophthalmic surgeon. Read before the American Academy of Ophthalmology and Otolaryngology in Cincinnati, September 17, 1935.

The progress that has been made in recent years should have lessened most of the complications in the operation for senile cataract; but changed technique in the hands of the less experienced may and does bring added dangers. There is, in fact, no single step in the operation that may not be the subject of controversy. When one sees the many sutures used in some cases and the more or less complicated mechanism, he may look with profit upon an old method in which capsulotomy and iridectomy were performed with the cataract knife while the corneal section was made, and the lens expressed by finger pressure through the lids. The few instruments used and the few seconds consumed in the operation invest this method with more than historic interest.

Many of the so-called minor complications that occur in making the incision are mostly the result of inexperience. The beginner should, therefore, practice the incision and iridectomy on pigs' and kittens' eyes until he can hold the eye with the double-fixation forceps in one hand and make the incision with the other without pressure on the globe.

He must early learn to appreciate the refractive displacement of the knife in the anterior chamber in order to make a proper counter puncture. He should not use the larger knives; the 32-mm. Graefe knife is best for him.

Most operators now prefer **conjunctival flaps.** Sometimes there is considerable bleeding from these flaps and blood may be drawn into the anterior chamber. The operation cannot proceed without removal of the blood either by pressure or anterior-chamber irrigation. This is not entirely devoid of danger; vitreous may be lost in the maneuver.

One of the most serious major disasters is the **sinking of the lens into the vitreous.** This is more liable to occurrence with the Barraquer suction method of operation. It has happened to me and I have seen it happen to others. While the lens rises up again and can be removed with the loop, it is nevertheless a most serious complication.

Prolapse of vitreous. If the vitreous is fluid it will escape as soon as the incision is made. Here it would be well for the operator to follow the suggestion of Harold Gifford, who read a paper before this Academy in 1920 "On backing out of cataract operations."[1] He reported a case in a man of 48 years in which the fluid vitreous escaped in such quantity upon incision that he stopped the operation and dealt with the cataract later by several needlings, finally getting useful vision, which was maintained for five years. I have under my care now a similar case in which I wish I had followed Gifford's advice. My patient was 47 years old, and was known to have had vitreous opacities for some time, but had had good results with glasses until the beginning of sclerosis of the crystalline lenses. This process had advanced to such a point in the left eye that vision was reduced to less than 20/200, the loss of vision being due more to the irregular astigmatism in the lens than to opacity. The operation was performed November 26, 1933. Upon making the incision and after its completion there was such an escape of fluid that the globe collapsed. I removed the lens with the hook. After weeks of convalescence and a needling a retinal detachment was found which has since been operated upon with but slight success. It is almost certain that the sclerosing lens and vitreous opacities in the other eye are also accompanied by a fluid vitreous. I expect to

deal with it by repeated needlings, as suggested by Gifford, but dread the long period of time which it will require and the uncertainty of the final result. In reporting his case Dr. Gifford said his patient had lost all sight in the left eye by some form of vascular degeneration 15 or 20 years before. I believe this to be significant of tuberculosis or focal infection. My patient has definitely had antrum disease and I have not yet become satisfied that there may not still be ethmoid involvement.

The loss of normal vitreous in the cataract operation is an entirely different matter. Lancaster[2] has said that normal vitreous does not come out of itself. Twenty-five years ago Beard[3] named squeezing of the lids on the part of the patient as the major cause. He also condemned overcocainization. Now we know that improved anesthesia and akinesia have been the most important factors in prevention.

I know of no bad results by the Van Lint method of lid injections and it is a certain preventive of spasmodic contraction of the orbicularis if properly introduced. The injection must be made deeply. It does not, however, prevent the nervous patient from moving his eyes about. If prolapse of vitreous occurs and a conjunctival suture has not been previously inserted, the eye should be closed at once. Any attempt to remove prolapsed vitreous or iris will result in more prolapse. If there has been a conjunctival suture so placed that it can be drawn up and tied with the lids closed, then some toilet of the wound may be possible.

One of my most serious cases of vitreous prolapse occurred just after the operation was finished. A nurse came suddenly into the room and asked me a question which caused the patient to turn his eye; a serious prolapse of vitreous resulted. In the hospital operating room quiet and freedom from distraction are essential. If there is a prolapse of normal vitreous before the lens is extracted, it is better to stop the operation and remove the lens at a subsequent operation. For some reason vitreous prolapse is not then so apt to occur. If one attempts to remove the lens with the spoon, he may lose more and more vitreous unless he is very expert.

It is not alone the loss of vitreous, which, if slight, is not serious in itself, but the position in which it may leave the iris and capsule, should these remain in the eye. One may have either an updrawn pupil or a very large pupil either with the iris in the wound or retroverted, due to the subsequent contraction of the vitreous that has been in the wound and anterior chamber. In addition, there are nearly always obstructive vitreous opacities. Thanks to Lindner[4] we now know that vitreous is not a culture media for the growth of bacteria.

Expulsive hemorrhage. This accident has occurred but twice in my experience in the cataract operation, but several times in operations for glaucoma. One of the cataract cases was reported in 1931.[5] I did not then use retrobulbar injections of novocaine and adrenalin. In a series of cases of avertin anesthesia recorded by Miss Nichol, chief anesthetist at the Silver Cross Hospital in Joliet, the blood pressure was reduced in every case: when high (182), it was reduced to 100; when low (108), it was reduced to 66.

F. A. Davis[6] of Madison referred to a case of reduction of intraocular tension from 60 to 0 during avertin anesthesia. It would seem that this might be the ideal method to prevent hemorrhage and perhaps other complications when one can secure at once such marked reduction in general blood pressure and also in intraocular tension. If expulsive hemorrhage occurs it is not advisable to remove the eye at once, as sometimes a normal globe may be retained.

Intraocular hemorrhage occurring after the operation can be arrested by the subcutaneous injection of adrenalin and ergot (Thilliez[7]).

In cases of **intraocular infection,** if discovered within 24 hours, most eyes can be saved by the deep orbital injection of 8 or 10 min. of a solution of cyanide of mercury 1 to 1,000, with 4 min. of 4-percent cocaine added to prevent pain.

Very few operators think it wise to examine the eye on the day after the

operation. If the patient is so unfortunate as to have an infection he will probably lose the eye, as only early treatment is effective. The cases that I have lost because of infection were those in which I did not examine the eye the day after the operation. Some form of foreign protein is useful in prevention and treatment. It is assumed that in every case the conjunctival sac and the lacrimal sac have had attention. There should never be any intraocular operation if the culture is positive.

I was recently informed of a case in which laboratory examination showed 11 colonies of staphylococcus growths. Notwithstanding, the operation was performed and the eye lost from infection. Any focus of infection about the face, mouth, nose, or ears should receive attention. Lindner said he does not bother with a conjunctival culture preliminary to extraction.[8]

I once operated on a patient who had had a chronic conjunctivitis for several years; the eye could not be freed from secretions and a negative culture was never secured even after treatment lasting two years. Finally, in the presence of a conjunctivitis with abundant secretion manifesting bacteria of many sorts, extraction was performed. Daily intramuscular injections of 10 c.c. of aolan were given and the patient made an uneventful recovery. We have no means of knowing when the patient may possess immunity, or whether this treatment created immunity. However, at the time of the operation I frequently give injections of foreign protein.

No precaution should be omitted as to patient, surgeon, or operating room. Is there any reason why the ophthalmic surgeon should not follow the rules of general surgery as to dress, mask, and rubber gloves? The mask should cover the nose as well as the mouth. The surgeon will find on use that he can operate as well with rubber gloves as without. Only prejudice keeps us from making this advance, as I can testify from personal experience.

Postoperative glaucoma. The best prevention of this complication is a smooth intracapsular operation, for this condition is usually due to iritic or capsular entanglements in the wound, also to cortex in the anterior chamber, and to epithelial ingrowth into the anterior chamber. If the tension persists, some operative method is necessary; preferably an iridectomy or iris-inclusion operation or trephining.

Glaucoma due to epithelial ingrowth is fatal to the eye. It may be caused by a delay in healing due to the presence of iris, capsule, or cortex in the wound or to the carrying into the eye of epithelial cells on the knife or on other instruments introduced into the anterior chamber. The prevention of this condition is obvious. Leave no foreign substance in the wound and have point and edge of knife sharp and free from any roughness.

There are occasional cases of postoperative glaucoma, usually following needling, which may recover without operation.

Late iris and vitreous prolapse is usually due to some accident. A well-placed protective bandage is the best preventive of this condition, using the Ring mask also.

On December 18, 1934, I performed an intracapsular extraction without complication on a man 68 years of age; one central conjunctival suture, no iridectomy. Three days later a sudden cough caused him to have pain in the eye. Examination showed lateral prolapse of the iris, which was removed. As long as the central suture held there was no prolapse above. However, a few days later this gave way, and there was marked bulging and prolapse of the iris above. This caused slow convalescence and will require future surgery. A firm pressure bandage might have prevented this complication.

Retinal detachment following cataract extraction is for the most part incurable. It is not necessarily a part of the operation but is caused by anterior choroiditis of tubercular or focal-infection origin.

If an aphakic eye in which visual results have been good suddenly begins to become filled with vitreous opacities, treatment should be directed to whatever area of infection may be found. If none are discernible, then treatment

with tuberculin is advisable. Fifty percent of all uveal disease is tubercular (Michael[9]).

The following is an illustrative case: The patient was 47 years of age. Two years after a cataract extraction with perfect results a retinal detachment occurred. This patient had been subjected to a most thorough physical examination. After a Walker diathermy operation, attachment was secured which held for three months and then recurred. The second eye was operated on for cataract with perfect results. Two months following the extraction, the vitreous in this eye became cloudy with exudate so that vision was reduced to 20/200. Metamorphopsia was also present. Under tuberculin treatment vision returned to 6/5 with a clearing of the vitreous and disappearance of the distortion. In this case also there was a slight focal reaction several times following the injections. In such instances I believe treatment with tuberculin to be justified even though the skin test may be negative, as it was in this case.

Irritation from retained cortex can be prevented only by the latter's complete removal. If in any case cortex is present and does not become absorbed the alternate use of atrophine and eserine will help. The surgeon may even be justified in the removal of cortex and capsule in a secondary operation; if necessary, under a general anesthetic. I have had no personal experience in the use of lens protein but much experience in other foreign proteins which apparently have their use in such cases.

Age is, perhaps, the greatest factor in the nonabsorption of retained cortex; the older the patient the more the eye will be irritated by cortex. It is a common experience that lens cortex is well tolerated in the young.

Sympathetic ophthalmia. This is fortunately a very rare complication. I once thought I had such a case until the pathologist reported that the enucleated eye did not show the characteristic epithelioid cells. Clinically, it was a case of sympathetic ophthalmia and the final result in the sympathizing eye was only enough vision to let the patient get about. One other case which did show the cellular changes followed the same course and left the patient with 20/200 vision in the sympathizing eye.

There are two rare but important postoperative complications which have received little attention in the literature: One is **corneal opacity**; not striated keritiitis, but a permanent, dense, central corneal opacity. I have had four such cases. I know of no treatment for this condition, but if it occurred in one eye I should use an undivided conjunctival flap in operating upon the second eye, preferably the Czermak subconjunctival method, which involves only a lateral slit in the conjunctiva. This might help in maintaining the corneal nutrition.

The other complication is a **fistula.** This should be dealt with early by placing a conjunctival flap over the fistula after cauterizing the fistula and under surface of the flap with nitrate of silver.

Observations and conclusions: The cataract surgeon should know his patient as well as possible. Therefore, a proper preoperative general physical examination is most important and should not be slighted. The examination of both eyes should disclose especially the pupillary reactions and intraocular tension.

If one is an infrequent operator or is operating in a strange environment, he may follow the procedure on paper first; that is, make a careful list of his requirements and the various drugs and instruments which he will use, and go over this in advance with the operating-room assistants.

Reserve the intracapsular operation for immature lenses in people over 55 years of age. Perform capsulotomy in mature cataracts at whatever age. In people under 55 years of age, having immature lenses, perform capsulotomy, removing the cortex by pressure and anterior-chamber irrigation; what is then left is usually taken care of by absorption, without serious consequence.

Conjunctival sutures are an advantage, but not a sure preventive of complications, except that the upper lid cannot enter into the anterior chamber. This accident has occurred twice in my experience, but fortunately was discov-

ered early enough to prevent loss of the eye.

Now the tendency is toward a peripheral iridectomy or iridotomy. This does not always prevent prolapse of the iris, so that full iridectomy is still the safer procedure. The advantage of the round pupil is so great, however, that in many cases occurring in the middle years of life it can be preserved without prolapse if the wound is covered with a previously formed conjunctival sliding flap (the Van Lint flap).

The need now is the perfection of a method for the removal of retained capsule in older patients. Arnold Knapp expressed this lack in 1928,[10] asking for better illumination. Hildreth[11] recommended the ultraviolet light. Nugent[12] wrote in favor of it, believing the need to have been met by the Hildreth light. I think the difficulty is not so much in seeing the capsule, except in certain cases, as in grasping it with any kind of forceps. May one hazard a prediction that some technique will be found by which this troublesome capsule may be removed after the lens is extracted? It is only exceptionally that one can remove the capsule with forceps. This need has not been entirely met by the instrument of D. M. Yazujian as described in a recent issue of the American Journal of Ophthalmology.[13] If the capsule is thickened, it may be removed by the capsule hook; but when dealing with the thin capsule use mild irrigation and mild suction.

Senile cataract is so common and so disabling to the patient and its removal so dramatic or so tragic, as the case may be, that we can not spend too much time nor thought on our failures as well as on our successes. May I again quote from Nicholas Senn: "Brilliant operators are not always the best surgeons. The best results in surgery follow the one who is most painstaking in the minutest detail."

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NOTES, CASES, INSTRUMENTS

REMOTE POINT FOR VISUAL-ACUITY TESTS

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As a test for visual acuity of distant objects we have accepted test types which subtend a visual angle of 5 minutes, the test usually being made at a distance of 20 feet. At this distance the emmetropic eye must exercise some degree of accommodation and convergence. To the extent that this physiological function is exercised in the normal eye for clear vision at 20 feet, the hypermetropic eye, when corrected for this distance, is in an equal degree myopic with the same tendency towards exophoria that is common in most eyes when the image tends to form in the vitreous. The exophoria encouraged by a minor degree of myopia thus artificially induced may scarcely be realized at short distances beyond 20 feet, but its effect increases in direct proportion to the square of the distance.

Every student of physiological optics is familiar with these refractive phenomena although in practice we usually proceed as though they did not exist. Because it is the common practice of the eye physician to prescribe glasses on the assumption that light rays emanating from an object at a distance of six meters are sufficiently parallel for normal vision at all distances, many persons are made to suffer from induced asthenopia, especially those whose vocations require visual concentration upon objects a block or two or a mile or more away. Automobile drivers comprise the greatest number who suffer from this error, although locomotive engineers, sailors, and airplane pilots are among others who require comfortable long-distance vision. Consequently many hypermetropic persons who have acquired compensation in a comfortable degree but who are in search of better vision begin to experience binocular asthenopia when wearing glasses prescribed according to the accepted method of testing visual acuity at a distance of 20 feet.

Until the beginning of the twentieth century and before the American people began to live to a great extent in automobiles, the arbitrarily established standard of 20 feet for the estimation of distant vision was satisfactory enough for most persons. In those days probably 90 percent of the visual work of the average individual was accomplished within a radius of 20 feet. Even motion pictures, which require considerable visual concentration, are more than this distance away. It is not so much the correction of the manifest hypermetropia at six meters, with its scarcely noticeable myopic effect for greater distances, that gives rise to complaint after attendance upon the theater, as the eyestrain that has been induced by an uncompensated exophoria. The slight myopic effect is noticed by the automobile driver at night, when far-away lights appear diffused and a closer-than-normal approach to objects must be made before they are clearly discerned.

In clear daylight, after long hours of travel, the slight dimness of objects in the distance is not so much complained about as the mental tiredness that is experienced. The customary manner of correcting the refractive errors of the hypermetropic patient may have more far-reaching effects than we at first might suspect. It causes visual effort and mental concentration to become more difficult when long continued, and herein lies the refractionist's opportunity to assist in reducing the number of casualties in automobiles that may occur because of a possible diminished alertness of the driver. Much time is often consumed in attempts to reduce the ill effects of exophoric asthenopia, which, no doubt, is often an induced eyestrain caused by blindly following an arbitrarily established standard that was more useful in the days of its inception than at the present time.

The outline of an object about seven

feet in diameter a mile away will subtend a visual angle of 5 minutes. When one-half-diopter sphere is deducted from a six-meter correction for hypermetropia the object appears to recede to a distance approximating infinity and a clearer conception of shades and colors has been attained. When examinations are made at a distance of three or at four-and-one-half meters, spheres of even greater refractive power must be deducted or added in hypermetropic or myopic corrections to afford visual acuity for much greater distances. When esophoria exists to a marked degree and such perfect distant vision is required that even lights seen at a great distance at night will not appear in the least diffused, it may be necessary to humor the vigorous internal recti by adding low-degree prisms, base out.

The present standard of measuring the refractive errors of the hypermetropic eye is sufficiently satisfactory for a considerable percentage of our population, such as housewives, salesclerks, factory workers, and others who live in congested centers of population. But for the automobile traveler, the truck driver, the farmer, the railway trainman, and all who require comfortable and acute distant vision, our accepted standard is apparently inadequate. If our offices are not so situated that a distance of at least a few blocks may be seen by the patient, much of our painstaking efforts may not be so productive of satisfactory results as they might otherwise be. A properly situated office suitable for making these distance tests should, in the opinion of the writer, be regarded as part of the necessary equipment of the ophthalmic physician.

5 South Federal Avenue.

A COMBINATION LOUPE AND HEAD MIRROR*

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NEW YORK

Because it has been found troublesome to remove the loupe attached to my spectacles in order to use a head mirror a combination loupe and head mirror was devised.†

The description of the loupe attached to the spectacle frame, both with and without a light, has been previously published.[1] The addition of the concave head mirror, 55 mm. in diameter with an aperture 6 mm. in diameter, seems to be practical not only for physicians

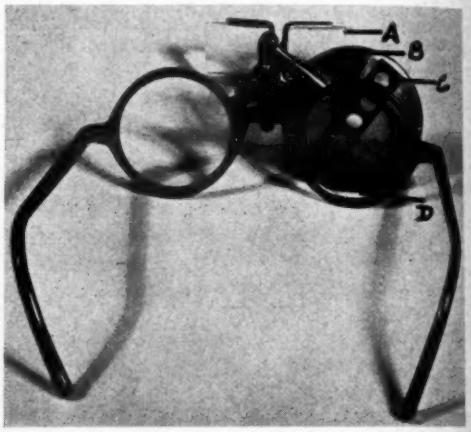

Fig. 1 (Berens). Head mirror with loupe and attachments for spectacle frame. *A*, modified Beebe loupe. *B*, head mirror. *C*, bar for insertion of plus lenses. *D*, bifocal segment.

treating diseases of the ear, nose, and throat, but it is useful also for the ophthalmologist who wishes to free both hands when examining and treating his patients. A sliding bar with an aperture and four cells to hold lenses adds to the value of the mirror for the presbyopic surgeon. The preferred lenses are +1.00, +2.00, +3.00, and +4.00.

35 East Seventieth Street.

* Presented before the American Academy of Ophthalmology and Otolaryngology, September 17, 1935, Cincinnati, Ohio.

† Made by the E. B. Meyrowitz Company, New York, New York.

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SOCIETY PROCEEDINGS

Edited by Dr. H. Rommel Hildreth

COLLEGE OF PHYSICIANS OF PHILADELPHIA

Section on Ophthalmology
March 1935

Dr. J. Milton Griscom, chairman

Voluntary control of accommodation

Dr. William Zentmayer presented two cases of this condition, a report of which has been published in this Journal (December, 1935).

Voluntary control of accommodation for distance

Dr. Warren S. Reese said that his patient's condition corresponded to that of Dr. Zentmayer's patients. On looking into the distance without glasses, the patient read 6/60 with each eye. If told to read distinctly, he was able to read 6/6 without squeezing the lids or changing his eyes, except that the right eye turned in and the pupils contracted. He was hyperopic 5.50 D. and wore the full correction. He was of a neurotic type, this evidently being dependent upon a gastric ulcer. The condition was of interest in that it illustrated the profound effect of accommodation on convergence. With his glasses on he was practically orthophoric. He had worn glasses since childhood and dated practically all of his symptoms from the time the gastric ulcer had appeared, one year ago.

Discussion. Dr. Alfred Cowan thought the increased accommodation was the result of convergence, not that the convergence was the result of accommodative effort. On examination of Dr. Zentmayer's patient he found a total accommodation of 10 diopters, while at 6 meters the greatest effort disclosed only 5 diopters; and this could be obtained only while he converged. Dr. Reese's case was of the same type. He examined Dr. Zentmayer's patient with the slitlamp and, in order to eliminate movement during convergence, he had the patient sight along a string which was stretched from the eye to a distance of 6 meters. One eye was sighted directly along this string while the other converged. The increase in curvature of the anterior surface of the lens seemed to be uniform all over. There could be seen no irregularity, such as a bulge in the central portion of the lens and relative flattening around the periphery.

Dr. H. Maxwell Langdon said that one of the most interesting features of this case was the control which the man had of each eye separately. Ordinarily when a person converged he turned each eye an equal amount from the primary position towards the other but this man could keep one eye directed straight ahead and do all the converging with the fellow eye.

Low-viscosity nitrocellulose used as an embedding medium for eyes

Dr. W. E. Fry said that Ruby had reported in 1933, that there were nitrocellulose products available, suitable for embedding masses. Wilson described the viscosity of commercial pyroxyline as ranging from one-half to 200 seconds, measured by the falling-ball test. In 1934, Davenport and Swank reported on the use of low-viscosity nitrocellulose for embedding, and noted that the alcohol, ether, and nitrocellulose solution would tolerate water up to 6 percent, thus permitting the use of 95-percent alcohol instead of absolute alcohol. Recently the same type of nitrocellulose had been used in embedding eyes, in the University of Pennsylvania laboratories, and sections of a whole eye had been obtained at 8 microns, and sections of the posterior half of an eye at 4 microns.

Shoemaker's modification of the Motais operation for bilateral congenital ptosis of the lids

Dr. Hunter W. Scarlett said that the Shoemaker modification of the Motais operation for ptosis of the lid consists in isolating, but not detaching any por-

tion of, the superior-rectus muscle, putting a double-armed suture through the tendon, and bringing the latter up to and attaching it to the superior border of the tarsus. The superior border of the tarsus is exposed by making a through-and-through incision in the lid, at a level of the upper border. After the tendon is sutured to the tarsus, the suture is brought out on the skin surface of the lid about 4 or 5 mm. above the ciliary border and tied around a small piece of rubber tubing.

A further report upon intracapsular cataract extraction by the Knapp method, as compared with the classical procedure

Dr. Leighton F. Appleman said that he had reported a series of 300 consecutive cases, in which 175 were operated on personally by himself, 100 by the intracapsular method of Knapp, and 75 by the classical method of expression; also 125 operated upon by assistants under his direction, 26 by the intracapsular method, and 99 by the classical method of expression.

After an analysis of the visual results, it was found that in 77 out of 100 intracapsular cases, and in 15 of the assistants' intracapsular cases out of 26 successfully done, or in a total of 92 out of 126 done, vision of 6/12 or better was obtained, a percentage of 73.01.

Of those done by classical expression, 48 personal cases out of 75 and 63 of the assistants' cases out of 99, or a total of 111 cases out of 174, resulted in 6/12 vision, or better, a percentage of 65.79.

Considering his own series alone, in the 100 intracapsular cases, vision of 6/12 or better was obtained in 77 percent; while of the 75 done by the older method 6/12 vision or better was obtained in 64 percent, a difference of 15 percent in favor of the intracapsular method.

He concluded that the intracapsular operation gave a remarkably smooth and rapid recovery, with scarcely any reaction; the patient required but one operation; the stay in the hospital was shorter, and the visual results better. He believed it to be superior to the older type of operation and therefore recommended its general use.

Discussion. Dr. George B. Cross (Chester, Pennsylvania) reported that he had been using the Hess forceps and making a small buttonhole iridectomy. Also it had been his practice to obtain a good-sized conjunctival flap, which made sutures unnecessary, especially if the flap was held down with a spatula for a short time just before the eye was closed. The natural tendency of the flap was to stick.

Dr. Appleman said that he had made no distinction as to the type of cataract upon which he tried the intracapsular extraction. Those that were immature, he was, at times, unable to grasp, due to the fact that the lens was in the stage of swelling, and in such cases he removed the lens by expression after capsulotomy.

Iridectomy had been performed previously to extraction in this series. He had tried to do simple intracapsular extraction without iridectomy only to find, at the first dressing, that the iris had bulged forward and caught in the wound. Retrobulbar injection he had used only once, the O'Brien facial block being usually employed. He preferred a small conjunctival flap, if possible, as the bleeding was less troublesome and a large flap became mutilated while the iridectomy was performed. Healing was just as smooth and uneventful without the flap.

Mucous-membrane graft for symblepharon; pedicle-flap blepharoplasty

Dr. Edmund B. Spaeth showed moving pictures of operations.

Discussion. Dr. George H. Cross liked silver conformers best, probably because he made them himself and could modify them to suit the individual case. He had just finished a new type of conformer without any hole in it and lined with a 1-mm. layer of lead. This was to be inserted between the eyelids and eyeball to protect the eye while X-ray therapy was being applied to new growths on the eyelids.

He said that Dr. deSchweinitz would remember that when he was in charge of the eye work in the Army during the World War, he saw many successful grafts that were punctured full of holes to allow serum and blood that had col-

lected beneath it to ooze through and prevent separation of the graft from its bed. The important factor in a successful graft was proper pressure. This was obtained by covering the eye with warm Kerr's modeling compound and applying a tight roller bandage.

Dr. Spaeth stated that in his opinion no matter how thin an epidermal graft was it was never wholly satisfactory, for the patient had a resultant chronic low-grade conjunctivitis and this was not present with the mucous-membrane graft. Naturally, this matter was of importance only in the presence of a normal eyeball.

A. G. Fewell,
Clerk.

CHICAGO OPHTHALMOLOGICAL SOCIETY

April 15, 1935

Dr. E. V. L. Brown, president

Nevus flammeus and megalocornea without glaucoma

Dr. Roy O. Riser said that this 9-year-old girl was brought to the Children's Memorial Hospital on March 18, 1935, with vision in each eye of 20/100, not improved by correction of the hyperopia. She also had a muscular instability, nystagmus, convergence, and divergence, occurring in rapid succession. The divergence was alternating and about 35 degrees. The right eye appeared normal in every way.

There was a large nevus flammeus on the left side of the face and palate, and X rays showed calcification in the left occipital lobe. There was a large polypoid nevus protruding from the left nostril. The left eye was large and the cornea clear, measuring 14 mm. There was a normal disc, with large tortuous retinal vessels. Tension was normal and the anterior chamber deep.

Discussion. Dr. Elias Selinger did not think that this could be classed as a case of nevus flammeus with megaloglobus and without glaucoma, because the large eyeball was evidence of glaucoma either past or present, and excavation of the nerve head was not necessarily part of juvenile glaucoma.

Dr. Richard Gamble thought that Dr. Selinger's point was interesting. The enlargement of the eyeball might be due to glaucoma, although in this case there was no other evidence of it. On the other hand, the eyeball might enlarge simply because it had an unusually great blood supply. In many of these cases all the structures of the face were larger on the side of the nevus.

The cause of glaucoma of this type might be due to the fact that the nevus extended forward into the root of the iris and blocked the filtration angle; it might be due to blocking of the vortex veins by a diffuse nevus of the choroid; it might be due to obstruction in the region of the cavernous sinus, and, finally, it might be due to the plasmoid character of the aqueous.

Before deciding to operate on such patients it was well to consider the possibility of a catastrophe, as a number of cases had been reported in the literature in which a severe hemorrhage occurred, so that enucleation had to be done. Even then, in several cases, the carotid had to be ligated. Inasmuch as these cases were usually unilateral, and the affected eye was, as a rule, nearly blind, it might be well to defer operation until the eye became either markedly enlarged or painful. The child presented had fairly good vision in the affected eye, and if other signs of glaucoma appeared, an operation was indicated, preferably a trephining.

Dr. M. L. Folk said that he had operated in two cases of nevus flammeus and glaucoma which turned out satisfactorily. The question here was whether in this case there was glaucoma or not. The eye was large with a deep anterior chamber, which spoke for glaucoma. On the other hand, there was no excavation of the disc. It might be advisable to take the tension under anesthesia as tactile tension could not be depended upon.

Hereditary anterior megalophthalmos

Dr. Roy O. Riser said that this boy, 10 years of age, was first seen at the Children's Memorial Hospital on February 21, 1934, with normal vision in each eye. Each cornea was clear and

measured 13.5 mm. Both anterior chambers were deep. The irides were tremulous, particularly at the periphery. There were no complaints. The tension and discs were normal, and there was an absence of all signs of glaucoma. The fingers and toes were normal.

A second case was that of a 3-year-old boy first seen at the Children's Memorial Hospital on June 26, 1933, with unusually large corneae, each measuring 13 mm. in diameter. This measure had now increased to 14 mm.

At that time there was an alternating divergent strabismus of 30 degrees. Tactile tension was normal. The corneae were clear and the anterior chambers normal. There was a tremulous iris in each eye. With —10 diopter lenses the eyes were almost parallel at times, while at other times the right eye would wander out 40 to 50 degrees. There was an absence of crypt markings in the irides. The discs were normal, and atropine cycloplegia did not cause rise in tension.

The family history was negative. The boy had long, thin fingers and toes, and wore shoes two-and-a-half sizes larger than normal for his age. He had a moderately expressionless face, these signs being classified under arachnodactylia or Marfan's syndrome, which was probably best associated with hereditary anterior megalophthalmos on a calcium-deficiency basis.

Ocular tuberculosis treated with tuberculin

Dr. Chester Lockwood said that the first patient, a woman 23 years of age, had first been seen in the eye clinic on December 27, 1934, with complaint of poor vision in the right eye of about two weeks' duration. The conjunctivae, corneae, and pupils were normal. The left disc and fundus were normal. In the right eye an area of acute chorioretinitis was seen below the disc, yellowish-white in color, with poorly defined borders, the area more or less gradually merging with the rest of the fundus. There was another similar area in the region of the macula. The disc outlines were somewhat blurred and the whole fundus was hazy and was seen with difficulty through the very cloudy vitreous. There were some precipitates on the posterior surface of the cornea. This patient had been sent to Cook County Hospital, where she remained until January 5, 1935. Typhoid vaccine was administered during this time. X rays of the chest and head were reported as negative; tuberculin skin tests were reported four plus for all four dilutions; the blood Wassermann test was negative. The patient had reported again to the clinic and had been started on tuberculin treatment, the initial dose of 1/10,000 mgm. of old tuberculin having been increased by 1/10,000 mgm. every second to fourth day.

At present the vision was O.D. 20/20 — 4, O.S. 20/20 + 4. There were many large vitreous floaters which still made the fundus appear slightly hazy. The areas of acute choroiditis and retinitis were improving in that there was less haziness and the areas were lighter in color and were more distinctly outlined from the surrounding fundus.

The second patient, a woman 25 years of age, had come to the clinic on July 21, 1934. The vision in the left eye had begun to fail one year ago when she had had pains in the left eye and left side of the face. When she was 5 years old she had had abscessed glands in the neck following scarlet fever. The vision was, O.D. 20/13, O.S. 20/50. The left fundus was diffusely involved in a chorioretinitis, mostly on the temporal side. The Wassermann test was negative. On August 1st, she was given old-tuberculin skin tests which showed a two-plus reaction. This patient also had tonsil tags, remaining from a previous operation, which had been treated by electro-coagulation. X ray of the chest showed no evidence of tuberculosis of the lungs.

This patient was started on old tuberculin treatment, 1/10,000 mgm. and given gradually increasing doses every two to four days, depending on whether or not she developed any reaction from the preceding dose. At the present time vision was O.D. 20/15, O.S. 20/40. In both eyes the corneae were clear, the

pupils reacted to light and were clear, there were no deposits on the back of the cornea, and tactile tension was normal. In the left eye, the disc outlines were fairly well defined. Throughout the fundus were many small and large irregularly shaped whitish areas with more or less well-defined borders, both the inside and the borders of the areas showing black pigmented spots. This was especially pronounced in the left macular area.

He said that several patients had been treated in this manner at the eye clinic during the past few years with no untoward results, so far as was known. The treatment had been used in case of scleritis, keratitis, uveitis, and choroiditis, when a positive skin reaction had followed injections of old tuberculin. In these two cases the first patient showed a marked improvement not only in vision, but also in the appearance of the fundus; in the second, the disease was apparently arrested.

Not long ago syphilis was generally blamed for many of these eye lesions, but lately one heard more and more that tuberculosis was the cause. Was one warranted in making a diagnosis of tuberculosis in cases that showed a positive reaction to injections of old tuberculin? Was one warranted in confirming such diagnosis when the eye condition improved under tuberculin treatment? Was the good result in these cases the result of a specific reaction to tuberculin, or the result of the foreign protein contained therein?

Essential progressive atrophy of the iris, with glaucoma

Dr. E. K. Findlay said that this woman, 35 years of age, was first seen in April, 1932. Fields of vision and tension were normal. A low degree of hyperopia was present. The right pupil was normal, the left pupil was oval in shape and contracted readily from above down and slowly from side to side. Two months later, in the left eye, a dark area had been noted at the inner side of the iris and at the same time the tension of the eye had increased to 38 mm. This tension had been controlled by pilocarpine, but two atrophic areas in the iris were well defined. Myopia had developed but with correction there was normal vision and very little contraction of the field.

In October, 1934, the tension had increased to 50 mm. Vision was reduced, the cornea steamy, and there was some pain. A sclero-corneal trephining had been done with uneventful healing. Since that time the tension had remained between 13 and 15 mm. The disc was cupped and the corrected vision 20/120. There had been a steady increase in the atrophic area.

Discussion. Dr. Sanford Gifford offered a theory as to why these patients developed increased tension when the iris became atrophic. It might be explained by the fact that the iris held the pectinate ligament open when the pupil was in tone. When a hole developed, the iris relaxed and the space closed. If one cut the pectinate ligament it would remain open, but if one cut the iris, the iris simply relaxed and the ligament was released, closing Fontana's spaces.

Minute structure of the retina in primates

Dr. S. Poljak said that the material for study had come from the retina of the monkey and ape; fresh human material had not been available. The method of staining was that of Golgi's.

The most important result of this study was the finding of three or four distinct varieties of bipolar cells (named d-, e-, f-, and h-variety) scattered all over the retina and mingling indiscriminately with one another. These three or four bipolar varieties were equally present also in the macula and fovea. The d-, e-, and f-varieties were diffuse, each being related to a group of rods and cones (polysynaptic bipolars); also their territories reciprocally overlapped. The h-variety was monosynaptic or individual, each bipolar cell being related to a single cone (cone- or midget-bipolar). The above arrangement was characteristic not only of the peripheral regions, but of the macula including the central fovea as well. There were six varieties of ganglion cells, also present in all re-

gions of the retina; five were of a diffuse, polysynaptic character, each being related to a smaller or greater number of bipolar cells; the sixth variety, or the midget-ganglions, exceptionally numerous in the macula, were monosynaptic; that is, each ganglion was related to the teledendron of a single cone-bipolar, although it might simultaneously be related to other bipolar varieties.

This study demonstrated in the primate retina several sets of neurons, present side by side and intimately interwoven into one another; the most delicate one was composed of monosynaptic neurons: the cones, the cone-bipolars and the small or midget-ganglions. This set was probably instrumental in fine space perception; another set was somewhat rougher and was composed of the rods and cones of all bipolar cells including the diffuse varieties, and of all six varieties of the ganglion cells.

Discussion. Dr. J. E. Lebensohn asked if Dr. Poljak had found any suggestion in his studies of the finer structure of the retina to indicate a difference between the cells subserving the visual function and those connected with the photo-motor response. Reports had been made by authoritative observers of cases in which the eye was insensible to visual stimuli but still reacted to light. The optic nerve had two types of fibers, small and large, which possibly had different functions. Was there anything in the retinal structure to explain these phenomena?

Dr. Poljak said that of course there were all kinds of fibers from fine to quite coarse; those from the macula were in general thinner than those from the retinal periphery. He admitted that it was impossible at present to answer Dr. Lebensohn's question, although there were certain ganglion cells that could, perhaps, be considered as reflex cells. Hess claimed that it was only the fovea and its immediate proximity which elicited the pupillary reflex. If that were so, one would think the central region of the retina would contain some special cells, absent in the rest of the retina. But such cells limited to the macula alone were not found. Nevertheless, one must think of this possibility. A recent paper by Gasteiger stated that the pupillary reflex could be obtained from any part of the retina. The Hess hypothesis was therefore not valid, and one wondered, if the reflex cells were scattered all over the retina, how they could be distinguished morphologically from other ganglion cells. To solve this it would be necessary to examine in suitable cases eyes in which the pupillary reflex was absent, and try to determine whether a particular ganglion variety were also present. As yet it is impossible to answer the question.

Robert von der Heydt.

NEW ENGLAND OPHTHALMOLOGICAL SOCIETY

March 19, 1935

Dr. James J. Regan presiding

A new needle holder

Dr. Frederick H. Verhoeff demonstrated his instrument.

A new type of perimeter

Dr. Charles Walker demonstrated the perimeter which is for use in a dark room. Lights are used instead of paper test objects. The lights run on tracks spaced every 30 degrees along the surface of the hemisphere. Glass filters and various-sized apertures are easily placed before the lights. A new device for fixation has been worked out on this instrument. Further reports on the work will be published by Dr. Walker at a later date.

Does diabetes contribute to cataract formation?

Dr. J. Herbert Waite read a paper on this subject which was published in the New England Journal of Medicine, March 14, 1935.

Trygve Gundersen,
Recorder.

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CONTEMPORARY CRITICS OF GRAEFE

Very many, perhaps even a majority, of the important discoveries in general science have been subjected to criticism and controversy; and the same is true of the science and art of medicine.

It was decades before Jacques Daviel's operation for the extraction of senile cataract attained universal acceptation. Today we see history repeating itself as the old battle between couching and linear extraction is paralleled by that between the extracapsular and the intracapsular technique for removal of the cataractous lens.

Albrecht Graefe, dead at forty-two years from tuberculosis, after a short but exceedingly brilliant professional career, has been so internationally admired and revered as a pioneer in modern ophthalmology that it may come to some as a shock to realize that his use of iridectomy for acute glaucoma was rather vigorously condemned by eye surgeons of great eminence, men who are given high praise whenever the history of ophthalmology in the second half of the nineteenth century is under discussion.

Graefe's first account of his use of iridectomy in the treatment of glaucoma was published in the "Archiv für Ophthalmologie" (of which he was founder, editor, and principal author) volume three, part two, 1857, under the title "Concerning iridectomy in glaucoma and concerning the glaucomatous process." A year earlier he had described the use of iridectomy in chronic iritis and iridochoroiditis; and it is an interesting fact that he also employed the operation in sympathetic ophthalmia.

The Medical Times and Gazette, of London, England, was for many years one of the outstanding examples of medical journalism of the nineteenth century. The volume of that journal for 1858 contains eight original papers dealing with iridectomy. The first, appearing in the issue for March 27th, was by J. W. Hulke, Assistant Surgeon

to King's College Hospital. In January, 1858, this same writer had read before the Royal Medical and Chirurgical Society a paper entitled "On some points in the pathology and morbid anatomy of glaucoma," which was discussed by Mr. Bowman and Mr. Critchett.

Hulke's essay in the Medical Times and Gazette speaks of mercury and the abstraction of blood as being the chief measures heretofore employed against this intractable and hopeless disease. Incidentally, reference is made to a fact which to the ophthalmologist of today sounds strangely; namely, that Graefe at first tried atropine in the treatment of acute glaucoma. Up to that time, the local operative treatment of the disease had been practically limited to paracentesis of the anterior chamber, the results of which were of course quite temporary.

Graefe commonly made his iridectomy at the inner side of the cornea, although he thought it might be made above for appearance's sake.

The use of iridectomy for glaucoma was, according to Hulke, introduced into England by Mr. Bowman, being first performed by him at Moorfields Hospital on May 1, 1857. It was subsequently taken up by Critchett and other members of the Moorfields Hospital staff. When Hulke wrote his essay for the Medical Times and Gazette, the operation had been subjected to extensive trial for six months and had "succeeded beyond expectation." Bowman preferred incision above, because of the cover furnished by the upper lid. Critchett modified Graefe's operation by making a small incision within the margin of the cornea, drawing out a portion of the iris with a flat hook, and leaving it in the wound.

In its main features, Graefe's operation for acute glaucoma received enthusiastic approval from Bowman, Critchett, Hulke, and other workers at Moorfields. But there were two British writers of light and learning who did not hesitate to question, not only the efficacy of the operation, but Graefe's ability as an ophthalmologist. The Medical Times and Gazette for April 3, 1858, presented a paper by T. Wharton Jones, Professor of Ophthalmic Medicine and Surgery in University College, London, and William Mackenzie, Surgeon-Oculist to Queen Victoria and Lecturer on the eye in the University of Glasgow, in which surprise was expressed at the operation's "having been so eagerly imported into this country." Jones and Mackenzie condemned Graefe's practice of iridectomy as "opposed to the plainest principles of surgery and common sense," and they had no doubt that in a short time iridectomy as a means of treating glaucoma would be abandoned in favor of "the practice ... of more frequently puncturing the cornea and sclerotica in this disease."

In fairness to Jones and Mackenzie, it must be mentioned that their condemnation of iridectomy for glaucoma was associated with criticism of its use for a variety of purposes, in some of which the operation has not so successfully withstood the onslaughts of time. They admitted the propriety of iridectomy in exclusion of the pupil.

The wholesale condemnation of Graefe by Jones and Mackenzie brought forth a number of controversial communications to the Medical Times and Gazette. In the issue for April 10, 1858, Thomas Windsor, Senior Assistant-Surgeon to the Manchester Eye Hospital, who had for some time been engaged on a translation of Graefe's own papers, took exception to some of the statements of Jones and Mackenzie as inconsistent with opinions previously expressed by Mackenzie in his well-known treatise on diseases of the eye. Two weeks later, writing from Berlin, where he had witnessed Graefe's operations and after treatment, James G. Hildige of Dublin pointed to like contradictions between the Jones and Mackenzie paper and Jones's statements in his "Principles and practice of ophthalmic medicine and surgery." "This," says Hildige, "is somewhat inconsistent with the high attainments and professional repute borne by this gentleman, and scarcely comes up to our English ideas of straightforward dealing. I have only to add that Professor von Graefe continues to perform his operation with success on patients who come to him

from all parts of Europe, and where every other treatment has failed."

In the issue of the Medical Times and Gazette for May 1, 1858, Graefe took up the cudgels in his own defense. He had been "doubtful whether the articles merited an answer or not, for the esteemed authors confess that they are without any personal experience on the questionable point," but he undertook a reply "as a tribute . . . to their earlier merits." After dealing with miscellaneous criticisms concerning the use of iridectomy and other inflammatory conditions, he passes "to the point which is most important to me, viz., iridectomy in glaucoma." The inadequacy, he points out, of paracentesis for glaucoma was clearly demonstrated for years in his own large practice. On the other hand, patients who under medical treatment aided by paracentesis had become completely blind in one eye were permanently cured by iridectomy on the second eye. He regrets that Mackenzie should regard as opposed to common sense a procedure which has been welcomed warmly by many leaders in ophthalmology.

The general tone of Graefe's reply was justifiably, although gently, sarcastic. In his conclusion he says: "I willingly pardon older, and so highly deserving men, for their want of that elasticity requisite for the immediate reception of new views; . . . but I should indeed have expected more moderation from the Nestor of English ophthalmology."

The lesson is obvious. None of us should be so tenacious of settled habit and conviction as to close the door to new methods or new opinions, no matter how far they may at first seem to depart from what we have regarded as true and wise. The innovation of today may become the settled practice of tomorrow, and a new vision may make "ancient good uncouth."

W. H. Crisp.

TRACHOMA

A General Assembly of the International Association for Prevention of Blindness and The International Organization Against Trachoma was held in Paris, in May, 1934. The proceedings of this Assembly have now been published. Professor de Grosz, chairman of the organization against trachoma, briefly reviewed the progress in the fight made against trachoma in Egypt that was started by MacCallan in 1903. There are now in Egypt 64 opthalmological hospitals or sections, and 32 school dispensaries; and in 1932 these institutions had 714,551 new patients.

The Health Committee of the League of Nations has compiled statistics of the prevalence of trachoma. In Lithuania, 34 percent of the inhabitants suffer from trachoma. In Japan, 700,000 cases were found, among ten million people examined. For Poland, the estimate was 400,000, and for Russia, 1,000,000 cases. Yet it is certain that under treatment the severity of the disease becomes attenuated; and the number of cases of incurable blindness has decreased.

MacCallan, reporting on conditions in the British Empire, states: "No universal scheme of prophylaxis for all countries can be recommended. Each country may require a different method." But "one method that should be applied to all countries is treatment in the schools." Segregation in trachoma schools has almost freed the schools of London from the disease. The epidemic in Amsterdam was wiped out. During the World War, trachoma was common among the labor companies brought from China, India, and Africa. But, by segregation and treatment of those affected, they were sent home better than when they came, and there was no extension of the disease among the armies in France.

In Egypt, trachoma appears as a sequel to the acute ophthalmias, caused by the gonococcus and the Koch-Weeks bacillus. But the proportion of the blind has decreased from 15.6 percent, in 1909, to 6.9 percent, in 1932. In southern Italy trachoma is a very serious matter. Of recruits rejected for the army in Sardinia, 63.5 percent were rejected for trachoma. Tunis, Algeria, and Syria are also greatly afflicted with trachoma. In the United States trachoma is almost confined to a belt, ex-

tending from the southern Allegheny Mountains to Kansas and Oklahoma, and to the Indian tribes. The negroes seem quite immune to trachoma. It is also common among the Indians of western Canada. Trachoma is a very serious cause of blindness in China, Indo-China, and the Dutch East Indies. In Java, the trachoma index is 5 percent among the Europeans, and 16.5 percent among natives. Racial immunity, or tendency to it, must be considered, but habits of living are very important.

The efforts to prevent trachoma have been greatly handicapped by ignorance as to its specific cause. In spite of our knowing that it is spread by contagion, the particular germ or virus causing it has remained uncertain. The observations recently reported in this Journal (1935, v. 18, p. 811) seem to throw important light upon the subject. But smallpox was eradicated by vaccination before there was the knowledge or the discovery of a germ for it, or of the nature of its specific virus. We know about trachoma that under regular, effective treatment it ceases to be contagious; and that by segregation and treatment, its spread can be controlled. Its tendency to cause blindness, either by corneal involvement or by distortion of the lids and consequent injury to the cornea, makes persistent treatment of it by well-known local remedies very important; and not only for the prevention of blindness, but for the comfort of the patient as well.

Edward Jackson.

EVALUATION OF CLINICAL AND LABORATORY FINDINGS

The correct evaluation of a method of treatment is often exceedingly difficult, even when both clinical and laboratory tests can be made. If the evidence derived from these two methods is in agreement, the case is apt to be proved, although both are open to errors. In those cases, however, in which clinical and laboratory findings suggest opposite conclusions, the physician is left in doubt. Usually, the clinician is the enthusiast; the laboratory worker the restrainer. As to the former, he can observe the action on the patient, and this is, after all, the point under consideration. But so many factors other than those in question can be influential in producing the effect in an individual subject, that it is not always possible to be certain that the therapy involved produced the result noted.

In the laboratory, known materials can be used and exact experiments performed. The test-tube outcome can be predicted and the laboratory possibilities of the new treatment can be determined. But man is no test tube, and in his enormously complicated mechanism are multitudinous unknown factors that may vitally modify the laboratory experiment.

It is best, therefore, to keep an open mind, to weigh most carefully laboratory evidence against clinical evidence, and if these differ to be slow in arriving at a conclusion.

In such a state is aniseikonia today. Thus far, no one who has used the new instrument for determining size-image differences and has prescribed the lenses indicated in the examination of many patients is known to have been unimpressed by the number of patients made comfortable by size-image corrections; and if ever there was a difficult group of patients with which to deal, this is it, for the unfortunates who compose it have been from pillar to post seeking without avail relief from the intolerable eyestrain of which they complain and which has usually incapacitated them for close work.

In the St. Louis eikonic clinic, which has been conducted for a year and four months, about sixty percent of those for whom eikonic corrections were ordered have been clinically helped—some of them amazingly. Every effort has been made to conduct the test critically and skeptically. The work has been done by an ophthalmologist whose only interest has been to determine, if possible clinically, whether there is real merit in this test. The importance of the psychic effect is never for one moment overlooked, and although every

effort has been made to eliminate this, its possible weight as a factor in the good results is so seriously considered that no clinical conclusion can yet be given.

On the other hand, though clinical evidence may seem very suggestive, laboratory tests indicate that the element of unequal size of retinal images in amounts found with the eikonometer cannot be of very great importance, since they are equalled or surpassed frequently in many of the activities of a routine day. An excellent article on this subject will appear in an early issue of the Journal. This and other theoretical papers previously published are so suggestive as to force the careful reconsideration of the cases clinically aided by eikonic lenses. It is difficult to explain as psychical many of the cases that we have seen personally, such as that of a thirty-year-old surgeon who said, when told that theoretically the help he was experiencing could not derive from his eikonic lenses, "Let me give my own evidence. I have tried the glasses out in every way for the past six months, and whereas I was about to give up surgery because of my ocular discomfort, I can now, when using the correct eikonic lens, carry on with perfect comfort."

This patient is only one of several who feel equally strongly and have been equally critical, but, obviously, this is not conclusive evidence. Other factors may be present that have influenced these persons favorably. Furthermore, some patients who apparently *should* be helped are not. The possibility that the correcting of aniseikonia may act favorably on heterophoria has been pointed out by more than one writer on the subject, and this factor must be considered.

More instruments will soon be in use. It is most important that clinical reports be published by those who have only a scientific interest in the matter, so that the truth can be determined as early as possible. This is the desire of the originators of the instrument. They have a strong belief that the subject is of great clinical importance. From the standpoint of the individual who is helped, it is unimportant whether his improvement is of mental or optical origin, but it is of great importance to the physician, for these are very elaborate and expensive tests to be done solely for their psychic effect.

Lawrence T. Post.

BOOK NOTICES

Pacific Coast Oto-Ophthalmological Society, 1935. 180 pages, 2 plates, 15 illustrations in the text. Published by the Society, Dr. Frederick C. Cordes, Secretary.

This twenty-third annual meeting of the Society was held in Portland, Oregon. The Society, with its 351 members, its 41 Honorary and Associate members, the latter scattered from Vienna and London to Victoria and San Diego, is devoted to both ophthalmology and oto-laryngology. The subjects of particular interest to ophthalmologists were: Surgical correction of pure convergence insufficiency; Hyaline bodies (Drusen) of the optic nerve and retina; Tuberculosis of the uveal tract; Spheno-palatine ganglion neuralgia, Iris bombé, The Genesis of glaucoma; A clamp for holding lid sutures in cataract operations; Unusual bilateral retinal detachment; and moving pictures of the Safar operation for detachment of the retina.

At this meeting the Society inaugurated an Instruction Course, of which no account is given in the Transactions. But for the course a synopsis was furnished of each subject; and, generally, with references to the periodical literature and books bearing upon it. The subjects of interest to ophthalmologists were: Uses of the cross cylinder; Injuries of the eye and their treatment; Practical application of slitlamp observations; Management of foreign bodies in the eyeball; Management of problems of cataract surgery; and Diagnosis and treatment of diseases of the cornea.

The interest manifested in such instruction has led to the policy of including it in connection with each annual meeting.

Edward Jackson.

CORRESPONDENCE

To insure permanent detachment of the root of the iris in glaucoma operations

January 15, 1936.

Editor,
American Journal of Ophthalmology:

In the January, 1936 number of the American Journal of Ophthalmology appears an article by Drs. Barkan, Boyle, and Maisler entitled, "On the surgery of glaucoma: Mode of action of cyclodialysis." In this article the authors stress the point that the successful cases were those in which the root of the iris and ciliary body remained permanently detached, allowing the drainage of the aqueous through this cleft into the suprachoroidal space. They further state, and correctly so, that in those cases in which the iris root re-adheres the tension rises postoperatively.

I am very much surprised that the authors made no mention of the operation reported a few years ago by Dr. Herbert Wootton from the Manhattan Eye, Ear and Throat Hospital, in which he combined the cyclodialysis operation with iridectomy at the same sitting. By this method he successfully prevented that re-attachment which is responsible for poor results.

Dr. Wootton has retired from active practice and is on an extended vacation so that this article very likely will not come to his attention for some time. Accordingly, I am taking this opportunity of writing this to you because I assisted Dr. Wootton in his first operation of this sort and also successfully performed some myself. I hope that you will be kind enough to publish this explanation of Dr. Wootton's operation in an early number of the American Journal of Ophthalmology.

(Signed) Joseph Levine, M.D.

ABSTRACT DEPARTMENT

EDITED BY DR. WILLIAM H. CRISP

Abstracts are classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is only mentioned in one. Not all of the headings will necessarily be found in any one issue of the Journal.

CLASSIFICATION

1. General methods of diagnosis
2. Therapeutics and operations
3. Physiologic optics, refraction, and color vision
4. Ocular movements
5. Conjunctiva
6. Cornea and sclera
7. Uveal tract, sympathetic disease, and aqueous humor
8. Glaucoma and ocular tension
9. Crystalline lens
10. Retina and vitreous
11. Optic nerve and toxic amblyopias
12. Visual tracts and centers
13. Eyeball and orbit
14. Eyelids and lacrimal apparatus
15. Tumors
16. Injuries
17. Systemic diseases and parasites
18. Hygiene, sociology, education, and history
19. Anatomy and embryology

1. GENERAL METHODS OF DIAGNOSIS

Balcet, Carlo. **The action of hydrochloride of methyloctenylamin on the eye.** Boll. d'Ocul., 1934, v. 13, Dec., pp. 1588-1601.

If instilled in from 2 to 10-percent solution in the conjunctival sac, the hydrochloride of methyloctenylamin, which has a relaxing action on nonstriated muscle, produces a mydriasis lasting about two hours. It irritates the conjunctiva for ten to fifteen minutes, provokes enlargement of the palpebral fissure and slightly increases ocular tonus, but does not disturb the accommodation. Thus it is useful in cases in which brief dilatation of the pupil is desired without paralysis of accommodation. (Bibliography.)

M. Lombardo.

Bücklers, Max. **Luminous point of fixation on the hand perimeter.** Klin. M. f. Augenh., 1935, v. 95, Sept., p. 375.

The mirror in the center is replaced by an electric lamp to insure steadier fixation. C. Zimmermann.

Castelli, A. **Experiments and observations on the mydriatic action of some sympathicomimetic substances.** Arch. di Ottal., 1935, v. 42, March-April, p. 95.

Experiments on the eyes of rabbits, pigeons and man were performed with sympathicomimetic substances including adrenalin and synthetic ephedrin. Results as to mydriasis, ocular tension, accommodation, and vascular reaction are given. Ephedrin 5 percent with 8 to 10 drops of adrenalin (1 to 1000) in 20 c.c. to reduce hyperemia gives the most constant mydriasis for ophthalmoscopic purposes with the minimum effect on accommodation. (Bibliography.)

Herman D. Scarney.

Fry, W. E. **Nitrocellulose of low viscosity used as an embedding medium for eyes that are to be sectioned.** Arch. of Ophth., 1935, v. 14, Sept., pp. 482-483.

The advantages of this method are more rapid and complete infiltration and embedding, less shrinkage, and thinner sections. The material is quite inexpensive. J. Hewitt Judd.

Kolen, A. A. **Red-free ophthalmoscopy with hard gelatin light filters.** Sovietskii Viestnik Opht., 1935, v. 7, pt. 1, p. 57.

Hard, colored gelatin filters prepared at the Leningrad Institute are used in ordinary direct and indirect ophthalmoscopy. The author finds this sort of red-free examination satisfactory for practical purposes. Ray K. Daily.

Lagrange, H., and Lagrange, A.-M. **Isolated abolition of the reflex pupillary adaptation to light. Symptomatologic**

value of Argyll Robertson sign. Ann. d'Ocul., 1935, v. 172, Aug., pp. 631-672, and Sept., pp. 729-774.

This is a comprehensive monograph on the Argyll Robertson syndrome. Five of Argyll Robertson's original observations (1869 A.D.) are reproduced. In 1899 Babinski associated the syndrome with neurosyphilis. Tables compiled by numerous observers are given to show the incidence of the syndrome in various forms of nervous involvement. From 30 to 60 percent of neurosyphilitics have an Argyll Robertson pupil. Toxic, meningitic, and ischemic factors are considered as possible causes.

The Argyll Robertson syndrome occurred in a number of nonsyphilitic conditions especially after trauma to brain, eyeball, orbit, or cervical or thoracic cord. The presence of the syndrome may have some localizing value in brain tumors. It has been encountered in tumors involving the pineal body, the tegmentum of the cerebral peduncles, the region of the corpora quadrigemina, the third ventricle, and the aqueduct of Sylvius; as well as in multiple sclerosis, syringomyelia, encephalitis, herpes zoster ophthalmicus, meningitis, various febrile conditions, intoxication by quinine and alcohol, and various organic psychoses.

The Adie syndrome, consisting of bradycoria and loss of tendon reflexes, with negative blood and spinal serology, is discussed in relation to its confusion with loss of photomotor reflex in neurosyphilis. John C. Long.

Mann, W. A., Jr. **Newer developments in photography of the eye.** Amer. Jour. Ophth., 1935, v. 18, Nov., pp. 1039-1044.

Marchesini, E., and Ghio, A. **Radiographic studies of the orbital pyramid by introduction of opaque substances.** Ann. di Ottal., 1935, v. 63, Sept., p. 662.

The authors have experimented with lipiodol, and other X-ray-opaque substances. The first three substances gave negative results. With thorotrast they obtained good results as to regularity of the radiographic picture as well as to perfect tolerance on the part of the tissues. They suggest this technique for more accurate study of retrobulbar new formations. The experiments were for the most part made on rabbits, but in two instances the method was used on human subjects. (6 tables, bibliography.) Park Lewis.

Mayer, L. L. **Light stimuli of minimal measured duration as a means of perimetry.** Arch. of Ophth., 1935, v. 14, Oct., pp. 451-553.

A new practical instrument utilizing a rapid red neon flash as a perimetric target has been devised. It was found that field defects were exaggerated by this method, and seventeen perimetric charts are presented to illustrate this. The technique is simple, the flash definite, and the instrument is such that bed patients can be easily examined. J. Hewitt Judd.

Rivas Cherif, M. **Photophthalmograph.** Arch. de Oft. Hisp.-Amer., 1935, v. 35, Sept., pp. 472-479.

With this new camera, by virtue of a special arrangement of the axes of observation and illumination, it is possible to photograph peripheral areas of the fundus which could not hitherto be reached with similar apparatus. A special arrangement eliminates the light reflex. (7 illustrations.) R. Castroviejo.

Sniakin, P. G. **A method for studying changes in the size of the blind spot.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 6, p. 826.

After a review of the literature the author discusses his own findings in two hundred examinations, using a campimeter of his own design. He points out that the size of the blind spot varies physiologically and may range from 28 to 10 c.c. at a half-meter distance. It varies especially with the weather, reaching the maximum in cloudy and the minimum in clear weather. Ray K. Daily.

Strampelli, Benedetto. **Ophthalmoscopic examination with polarized light.** Boll. d'Ocul., 1935, v. 14, April, pp. 595-599.

A Nicol A prism which polarizes the light linearly is connected with a common electric ophthalmoscope. Direct and indirect examination can be made. The advantages are that the reflexes coming from the dioptric media, from the central macular region, and from other parts of the fundus, as well as the central white reflex of the blood vessels, are eliminated, and that some abnormal conditions are more sharply distinguished. (7 figures.) M. Lombardo.

2. THERAPEUTICS AND OPERATIONS

Beer, Leon. **The use of argocal in ophthalmology.** Klinika Oczna, 1935, v. 13, pt. 3, p. 654.

The author recommends the use of this derivative of silver nitrate, manufactured in Poland, because it is much cheaper than argyrol. Ray K. Daily.

Bender, A. **Pantocaine and its noxiousness.** Klin. M. f. Augenh., 1935, v. 95, Aug., p. 251. (See Section 16, Injuries.)

Cepero, G., and Comas, C. **Ophthalmodiathermy and the arsenobenzols.** Rev. Cubana Oto-Neuro-Oft., 1935, v. 4, May-Aug., p. 85.

The use of diathermy has been found of benefit in the treatment of luetic eye involvement and in the prevention of local eye reactions attendant upon specific antiluetic treatment.

M. Davidson.

Daminskii, D. C. **Gravidan in the therapy of ocular diseases.** Sovietskii Viestnik Opht., 1935, v. 7, pt. 2, p. 204.

This is a detailed discussion of the pituitary hormones and a report of nine cases of various ocular lesions treated with injections of gravidan-sterilized urine of pregnant women. The effect was improvement in general condition, increase in weight, increased percentage of hemoglobin, and better mental condition. Locally there was amelioration of the subjective symptoms, without arrest of the pathologic process. On glaucoma the effect was entirely negative. Ray K. Daily.

Disler, H. H., Grinko, E. P., and Shadskaja, O. **The use of the benzyl ester of cinnamic acid in the treatment of ocular diseases.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 6, p. 813.

A detailed report of four cases of suppurative keratitis, two of scrofulous keratitis, and eight of trachoma treated with intramuscular injections of 3.2 percent solution of the benzyl ester of cinnamic acid. The authors noted improvement in the general well-being of the patient, and absence of local or general reaction. Improvement in the ocular condition, manifested as an active hyperemia with new blood-vessel formation, had to be admitted in spite of a very critical attitude. This effect was more pronounced on the cornea than on the conjunctiva. Ray K. Daily.

Fiore, Tito. **Action of urea on the hemato-ophthalmic barrier.** Boll. d'Ocul., 1935, v. 14, April, pp. 549-552.

A few rabbits were injected with solutions of coloring substances which usually do not pass from the blood into the aqueous. In this first series of experiments the aqueous did not contain any of these substances. But when pure urea had been added to the solution to be injected, the coloring substance was found in the aqueous. The writer noted also that a greater amount of salvarsan was found in the aqueous if urea had been added to the solution to be injected. He concludes that some diuretics increase the permeability of the hemato-ocular barrier. (Bibliography.) M. Lombardo.

Gala, A. **Diocaine and idiosyncrasy.** Ceskoslovenska Ofth., 1935, v. 2, no. 1, pp. 39-46.

Over a ten-year period the author used diocaine for superficial anesthesia in thousands of cases for various purposes, including tonometer readings. It never increased intraocular pressure, even in cases of glaucoma. One case of glaucoma showed an idiosyncrasy for the drug. The patient developed acute conjunctivitis with secretion, edema of the lids, blepharospasm, itching, and burning, lasting for six days.

Georgiana Dvorak Theobald.

Gala, A. **The cause of insufficient local anesthesia with cocaine.** Ceskoslovenska Ofth., 1935, v. 2, no. 2, pp. 87-92.

Two drops of 5-percent cocaine in normal salt solution were instilled into the conjunctival sac every three minutes for seven instillations. The sac was then irrigated with normal salt solution. Aqueous was withdrawn and was tested quantitatively for cocaine by the colorimetric method with Mayer's reagent ($HgCl_2$ and KI). The author found almost equal amounts of cocaine in the aqueous of an inflamed eye (iridocyclitis, keratoconjunctivitis, glaucoma) and in the aqueous of an eye normal except for optic nerve atrophy. He concludes therefore that the cause of slight and insufficient anesthesia of an irritated eye depends upon the character of the inflammation, and not on lessened absorption by the tissues and blood vessels. In an irritated eye, the tissue is more sensitive and so for complete anesthesia needs a greater amount of anesthetic or another method of application than instillation.

Georgiana D. Theobald.

Germer, O. I., and Kulieva, M. X. **Carotin in ophthalmology.** Sovietskii Viestnik Opht., 1935, v. 7, pt. 2, p. 159.

From comparison of the various preparations of carotin used in Russia, the author is impressed by the relief from pain and blepharospasm following instillations of carotin into the conjunctival sac. It also hastens recovery and has an anesthetic effect on the cornea. Ray K. Daily.

Guerrieri, Guerriero. **Contribution to the knowledge of permeability and diffusion phenomena of the cornea.** Boll. d'Ocul., 1934, v. 13, Dec., pp. 1545-1587.

Experiments were made on 34 rabbits to determine whether diffusible substances instilled or injected subconjunctivally or hypodermically could be found in the cornea. As diffusible substances the ferrocyanide of potassium, and potassium iodide in solutions hypertonic, hypotonic, or isotonic to the aqueous, were used, and to detect their presence a solution of iron perchloride, and a mixture of starch, sodium hyponitrite, and sulphuric acid, were used respectively. The experiments were conducted on intact cornea, on cornea with abraded epithelium, or on ulcerated cornea. Hypotonic and hypertonic solutions were found in the cornea and even in the aqueous in all the experiments. Isotonic solutions if instilled spread toward the interior of the eye with abraded epithelium, or if used subconjunctivally or hypodermically. Very small traces were found in the infiltration around the ulcerated cornea. The writer concludes that an instilled substance spreads toward the interior of the eye through the cornea and that the corneal epithelium regulates the diffusion. (Bibliography, 4 photomicrographs.) M. Lombardo.

Jacobson, J. **The use of the benzyl-ester of cinnamic acid in ophthalmology.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 6, p. 808.

The benzyl ester of cinnamic acid neutralizes in vitro a lethal dose of tuberculin, diphtheria, or tetanus toxin. It dilates the peripheral and central blood vessels, arrests bacterial growth, stimulates leucocytosis, and hastens cicatrization. In ophthalmology it was first tried in trachoma, after the observation that trachoma had spontaneously improved in an Algerian treated for tuberculous adenitis. Its application to the treatment of trachoma in Tunis demonstrated its value. It was also found useful in keratitis.

Ray K. Daily.

Kaminskaja, Z. A. **A method of study of the blood vessels of the anterior ocular segment.** Sovietskii Viestnik Opht., 1935, v. 7, pt. 1, p. 59.

The author found that diathermy produced hyperemia lasting 30 to 35 minutes. After its use in parenchymatous keratitis, blood vessels with circulating blood could be seen in the cornea where none had been seen previously. Slitlamp study of the blood vessels of the cornea and limbus should be repeated after application of diathermy. Ray K. Daily.

Kasas, I. I. **Five mistakes in the treatment of ocular syphilis.** Sovietskii Viestnik Opht., 1935, v. 7, pt. 2, p. 230.

These are failure to begin the treatment with mercury, the dangerous use of provocative injections, insufficient medication, monotherapy, and standardized dosage. The author uses a carefully determined course of treatment for each patient, taking into consideration general condition, social environment, and tolerance for drugs. He ridicules the standardized dosage of the German school, determined by vote of the syphilis commission, and not based on scientific data. Ray K. Daily.

Katz, Dewey. **A new bandage for the eye especially recommended for use after intraocular operation.** Arch. of Ophth., 1935, v. 14, Aug., pp. 263-265. (Drawings.)

A Fox aluminum shield is fastened to the skin of the cheek by two or more strips of adhesive tape, and to the brow by two or more other strips with their lower ends turned under. To change the dressing the upper strips are pulled loose from the shield, which can then be turned down with the lower strips as a hinge. J. Hewitt Judd.

Landes-Leinerowa, L. **X-ray therapy of ocular diseases.** Klinika Oczna, 1935, v. 13, pt. 3, p. 514.

In ocular inflammations such as iritis, conjunctivitis, dacrocystitis and parenchymatous keratitis the author at first used X rays only after all other therapeutic measures had failed. Having obtained good results in 50 to 80 percent of such cases she is very enthusiastic about X-ray therapy in all inflammatory diseases of the eye and its adnexa. The dosage is 80 to 100 R., 100 to 180 K.V., treatment at five to ten day intervals, the total dosage for six months not to exceed an erythema doze.
Ray K. Daily.

Levine, Joseph. **Use of Coley's mixed toxins in ophthalmology: further observations.** Arch. of Ophth., 1935, v. 14, Oct., pp. 554-556.

The preparation known as Coley's mixed toxins is a vaccine made from killed cultures of Streptococcus erysipelatis and Bacillus prodigiosus. It is used as a foreign protein, and administered intramuscularly in doses of from one to six minims, depending on the weight and condition of the patient. The reaction comes on after six hours and consists of chills and a fever ranging from 101 to 103°F. No complications have followed several hundred injections. The product is extremely cheap, a three-minim dose costing less than five cents. J. Hewitt Judd.

Liebermann, L. **Technical details of eye surgery.** Klin. M. f. Augenh., 1935, v. 95, Sept., p. 305.

For disinfection of the hands the author recommends brushing for five minutes with a hypochlorite paste (magnosterin), which constantly liberates free chlorine. For illumination he uses a head lamp with lenses of 2-cm. focus. For iridectomy in glaucoma with shallow anterior chamber he incises the limbus from without with a scalpel.
C. Zimmermann.

Mayer, L. L. **Larocaine, a new anesthetic.** Arch. of Ophth., 1935, v. 14, Sept., pp. 408-411.

This synthetic drug is the p-aminobenzoyl ester of 2,2-dimethyl-3-diethylamino-1-propanol, and is akin to procaine and tutocaine. When instilled it produces no change in pupil, accommodation, or tension. A chart shows the anesthesia (as tested with Frey's hairs) obtained in the normal human cornea with solutions varying from 1 to 40 percent. Clinical use has given excellent results. J. Hewitt Judd.

Melanowski, W. H. **The eye and radiant energy.** Klinika Oczna, 1935. v. 13, pt. 3, p. 492.

A review of the literature relative to physical properties of the various light rays and their effect on the eye.
Ray K. Daily.

Narog, Franciszek. **Further studies on the therapeutic effect of ultraviolet rays and the high frequency current in ocular affections.** Klinika Oczna, 1935, v. 13, pt. 3, p. 532.

On the basis of 150 cases treated with ultraviolet rays the author concludes that this treatment should be resorted to only after all other therapeutic procedures have failed. The Birch-Hirschfeld lamp is most effective in tuberculous lesions of conjunctiva, cornea, and iris. In corneal ulcers it is only an auxiliary and is indicated principally to raise the local defenses in allergic individuals and those of lymphatic diathesis. General irradiation with the quartz lamp is indicated in scrofulous lesions. Local irradiation with the quartz lamp gave good results in three cases of elephantiasis of the lids, and in several cases of blepharitis and trachoma. The author found high frequency quartz electrodes beneficial in dystrophies of the cornea, muscular paralyses, hemophthalmos and uveitis. Diathermy coagulation may be used for small growths, trachomatous hypertrophies, pigment spots, and excision of the lacrimal glands and of prolapsed iris, as well as in retinal detachment.

Ray K. Daily.

Pereyra, Giorgio. **Medical and surgical diathermy in ophthalmology.** Boll. d'Ocul., 1935, v. 14, Feb., pp. 254-265.

The writer reviews the progress of medical and surgical diathermy in clinical applications and therapeutic results. Among surgical applications he mentions a method for optical iridectomy by Schmerl, Lacarrère's method of intracapsular extraction of cataract, and the recent application to detachment of the retina. M. Lombardo.

Poos, F. **Paradoxic mydriasis with stimulants of the sympathetic, resembling adrenalin.** Graefe's Arch., 1935, v. 134, p. 268.

A satisfactory explanation can not yet be given for so-called paradoxic mydriasis from adrenalin or the elevated threshold from instilling a solution of adrenalin 1 to 1000 on the side of a sympathetic paralysis or in an animal on the side where the superior cervical ganglion has been extirpated. The author found in human beings and rabbits that sympatol, corbasil, ephetonin, icoral, oxin, tyramin, ergotamin, and orasthin, that is substances resembling adrenalin in their action on the blood vessels, heart, and bronchial and other smooth musculature, produced a similar mydriasis under the same conditions. Cocaine was the only one of such substances not causing the same response. H. D. Lamb.

Promtov, V. A. **A new anesthetic—diotan.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 6, p. 836.

The Soviet Chemico-pharmaceutical Institute has developed a synthetic local anesthetic with formula $C_2H_{27}O_4N_3HCL$ and patented under the name of diotan. This report of the experimental and clinical investigations shows that a solution of diotan is stable and is not impaired by boiling; does not widen the palpebral fissure, paralyze accommodation, dilate the pupil, injure the superficial corneal epithelium, or raise intraocular tension; is very slightly toxic in comparison with cocaine; and produces satisfactory anesthesia. It has the unpleasant features of producing a burning sensation and of dilating the conjunctival blood vessels. Ray K. Daily.

Sitzimkopfova, Helena. **Attributes of sodium-evipan narcosis.** Ceskoslovenska Ofth., 1935, v. 2, no. 1, pp. 46-50.

The author reports clinical experience with sodium-evipan in 39 cases of eye surgery. The age of the patients varied from one to 87 years. There were no contraindications to use of evipan. The dosage varied from 1.5 to 10 c.c. Respiration, pulse and blood pressure remained without marked change. The sleep was quite deep, of short duration, and without subjective or objective disturbance. Great postoperative restlessness, of long duration, was observed in four children.

Georgiana Dvorak Theobald.

Talkovskii, S. T. **The neurotropic theory of Speranskii and novocaine blocking in ophthalmology.** Sovietskii Viestnik Opht., 1935, v. 7, pt. 1, p. 3.

In eighty cases the usual treatment was augmented by novocaine blocking in the periadrenal fascia, according to

the method of Vishnevskii. Only one blocking was administered in each case, and 36 percent of the cases thus treated were benefited. The treatment was most effective in incipient inflammatory processes, with edema and serous exudation predominating. The rapid disappearance of edema and amelioration of the inflammatory reaction were striking. In a number of cases in the stage of suppuration the diseased area became sharply demarcated from the healthy tissue and the purulent focus or infiltrate seemed to melt away.

Ray K. Daily.

3. PHYSIOLOGIC OPTICS, REFRACTION, AND COLOR VISION

Ames, Adelbert. **Aniseikonia—a factor in the functioning of vision.** Amer. Jour. Ophth., 1935, v. 18, Nov., pp. 1014-1019.

Anastasi, Licio. **Unilateral myopia.** Boll. d'Ocul., 1935, v. 14, March, pp. 328-351.

From a study of 1,541 cases of unilateral myopia the writer comes to the following conclusions. It represents a congenital anisometropia or it manifests itself in the first decades of life. It is more frequent in the female sex (sixty percent). Corneal opacities are a cause of development of low unilateral myopia. Divergent strabismus frequently occurs. Heredity and school work are among the most frequent causes. In a small percentage of the cases the refractive defects may be corrected. (Bibliography.)

M. Lombardo.

Baschenov. **Inability to close one eye.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 6, p. 870.

Inability to close one eye was found in twenty percent of nine hundred men examined. Of these 78 percent could not close the right eye alone, 17 percent the left eye alone, and five percent either eye alone. This inability must be of cortical origin and represents an atavistic phenomenon. From a practical standpoint it is of importance in sharpshooters, who usually close the left eye while focusing with the right, and in drivers of vehicles, who may find it necessary to close an injured eye while getting to a place of safety under guidance of the other eye. Ray K. Daily.

Bertotto, E. **Contact glasses, their use and their present status.** Arch. de Oft. de Buenos Aires, 1935, v. 10, July, p. 484.

The Dallos method of making individual molds of the eye and making the contact glass to measure is described.

M. Davidson.

Biffis, Andrea. **Position of the iridic diaphragm in the eye.** Boll. d'Ocul., 1935, v. 14, Feb., pp. 288-295.

The author studied the proper position of the iris in a schematic eye in order to eliminate the sagittal halo with its aberration, which interferes with distinct vision. By mathematic calculations the place of election of the normal and real pupil was found to be at 3.65 mm. behind the corneal vertex. This position affords clear vision and makes the normal eye a perfect organ. (Bibliography.) M. Lombardo.

Cori, R. de. **Considerations and calculations on the depth of the visual field.** Boll. d'Ocul., 1935, v. 14, June, pp. 753-767.

The writer calculates the depth of the visual field, demonstrating that this is in relation to the distance of the object, the diameter of the pupil, and the wave length of light. Practically, however, binocular vision is greatly influenced by the psychologic factor.

M. Lombardo.

Gifford, S. R. **Some notes on the treatment of strabismus.** Trans. Pacific Coast Oto-Ophth. Soc., 1934, 22nd annual meeting, p. 165.

Early diagnosis and treatment are important to determine whether fusion training will benefit. Refraction with cycloplegia is always indicated first. The author believes that fusion is not absent in alternating squint but is under-developed. About 30 percent of the cases, especially those due to accommodative errors, may be corrected by refraction and occlusion plus orthoptic training. The lower degrees of squint,

especially under fifteen degrees, respond much more readily to this treatment. Operation is advised at any age when the results obtained by the above methods have been exhausted. Stress is placed on the advantages of operating upon both lateral recti of the same eye at the same time. M. E. Marcove.

Herzog, Max. **On refraction and prescribing of glasses in the U.S.A.** Zeit. f. Augenh., 1935, v. 87, August, p. 37.

Herzog, working in the private office of a representative American oculist, is impressed with the exactness of American methods of refraction and the correction of very small errors. The optometrist who does refraction is unknown in Germany. The author describes a routine method of refraction which includes preliminary subjective tests with trial lenses, examination under cycloplegia, postcycloplegic test, and checking the adjustment of the frame he finds noteworthy. Almost complete neglect of the ophthalmometer. Hyperopia is corrected much more frequently than in Europe, and full correction of myopia is more usual. (See also editorial, Amer. Jour. Ophth., 1935, v. 19, Jan., p. 54.)

F. H. Haessler.

Holth, S. **Kinescopy—objective and subjective.** Brit. Jour. Ophth., 1935, v. 19, Nov., p. 603.

This apparatus for the determination of the principal meridians in astigmatism has an adjustable standard, and suspended from the standard by an arm is a target in the center of which is a disc 2.5 cm. in diameter with a 5-mm. light opening in its center. This opening is to be placed on a level with the patient's eye. Projecting from this black central disc is a white meridian pointer 5 mm. wide and about 18 cm. long, on a black rotating disc. Around the periphery are markings indicating the axis. The central "light opening" is in immediate contact with the center of the wall of a frosted 75-watt electric lamp. By rotating the axis of this light streak the axis of astigmatism is determined. D. F. Harbridge.

Ladekarl, P. M. **Color distinction in the normal and in the color blind.** Acta Ophth., 1934, Supplement 3.

This very exhaustive study contains a comprehensive review of the literature and a detailed report of the author's own investigations. He claims greater accuracy because Ascher's apparatus permits simultaneous adjustment for color and intensity, not possible with the equipment of former investigators. The measure of perception was the average error of forty tests at each wave-length tested. The perception curves plotted from the tests show two areas of maximum perception for trichromates and one for dichromates. Other areas reported by former investigators the author attributes to errors in technique. Both the trichromates and the color blind show an area of maximum perception at 480 microns in the blue-green field. The curve of the trichromates shows another area towards the red end of the spectrum at 580 microns for the normal, at 600 for the green defective, and at 570 for the red defective. The perception of the protanomalope falls rapidly and markedly towards the red end of the spectrum, while the deuteranomalope is capable of perceiving there more shades of red than the normal. Between 657 and 635 microns the trichromate distinguishes 111 shades, while the deuteranomalope distinguishes only 65 shades, in spite of his superior ability in the red field. The interrelation of various types of defects in color vision is shown by a mathematical computation from perception curves for the various colors. The tests for maximum intensity in the spectrum for each type of color vision show that the maximum intensity of the deuteranope is further in the red end of the spectrum than for the normal, and further for the deuteranomalope than for the deuteranope. In the protanope the area of maximum intensity is shifted toward the violet end of the spectrum and the shift is greater in the protanomalope. The perception curves of three women, who carried the color-defect-containing chromosome, and who were generally believed to have normal color

perception, demonstrated reduced sensitivity in the entire spectrum, particularly marked in the green and blue-green fields. The color matching and intensity curves, however, showed no deviation from the normal.

Ray K. Daily.

Lipschutz, Hermann. **Myopia and near work.** Brit. Jour. Ophth., 1935, v. 19, Nov., p. 611.

The question of the influence of near work in the development of myopia is not yet satisfactorily answered. Most theories explain the bad influence as due to pressure exercised by the horizontal muscles. This paper deals with congestion of the venous outflow from the eye and orbit in the stooping posture. The author studied the venous congestion within the eye by examining the venous pulsations which occurred when the head was bent extremely forward. D. F. Harbridge.

Moore, R. **Subjective "lightning streaks."** Brit. Jour. Ophth., 1935, v. 19, Oct., p. 545.

This communication calls attention to a fairly common phenomenon. The occurrence of light flashes is compared to lightning. It is experienced periodically for a few weeks or months, most frequently in the dark, is referred to the temporal side and followed by spots before the sight. During the past two years this observer has studied twenty-six cases. His conclusions are that the symptoms are not indicative of any serious fundus changes or field defects. While he has no definite explanation to offer he is inclined to believe that the most likely cause is a gradual increase in size and then rupture of a peripheral cyst.

D. F. Harbridge.

Muselevich, A. L., Zundelevich, P. I., and Fradkina, M. I. **Constitution, myopia, and vocation.** Sovietskii Viestnik Opht., 1935, v. 7, pt. 2, p. 240.

From records of six thousand and five workers examined at the Institute of Hygiene and Labor, the author sought to correlate myopia to flat feet, type of constitution, and occupation. The tables show no relation of myopia to flat feet or type of constitution as claimed by Kushel. They show definitely a relation between myopia and work. In occupations requiring the use of the eyes for near work 24.14 percent of the workers were myopic, while only 14.28 percent of workers in other occupations were myopes. Ray K. Daily.

Ochapovsky, S. **Genesis of the refraction of the human eye.** Arch. of Ophth., 1935, v. 14, Sept., pp. 412-420.

The author presents the theory that the refraction of the eye at different periods of life is an ontogenetic expression of the regularity of individual development. Variations in the refractive state of different persons are phylogenetic expressions of the development of the genus. The author is convinced that environment and occupation have little to do with the changes in the refraction of any individual.

J. Hewitt Judd.

O'Rourke, D. H. **How I do a refraction.** Trans. Pacific Coast Oto-Ophth. Soc. 1934, 22nd annual meeting, p. 113.

This very practical discussion of routine procedure is well worth reading. (Discussion.) M. E. Marcove.

Pascal, J. I. **Myopia and exophoria.** Arch. of Ophth., 1935, v. 14, Oct., pp. 624-626.

Exophoria may produce axial myopia through compression of the globe by the extraocular muscles, and a "tonic" myopia by constant overstimulation of accommodation resulting from constant overstimulation of convergence in children having a "tight hook-up" between these. Stereoscopic exercises to weaken this association are advised as prophylaxis. J. Hewitt Judd.

Rolett, D. M. **Is full correction of value in checking the progress of myopia?** Arch. of Ophth., 1935, v. 14, Sept., pp. 464-472.

This report is based on the study of 772 myopic patients. The condition was progressive in 565, and of these 220

were classed as malignantly progressive. Despite full correction, 73 percent showed advance of myopia and complications were just as common. In the advanced progressive class only 1.7 percent retained normal vision. The author concludes that proper correction has little or no influence on the progress of myopia. J. Hewitt Judd.

Samoilov, A. I. **Clinical studies in color vision.** Sovietskii Viestnik Opht., 1935, v. 7, pt. 2, p. 200.

A detailed report of the findings in a fifteen-year-old monochromate, tested on the anomaloscope and the Hess disc. The difference between the size of the pupil in this monochromate and in a normal person is shown graphically. Her parents were cousins, but they as well as the patient's three brothers had normal color vision. Ray K. Daily.

Weintraub, J. D. **Retinoscopy at a definite distance.** Arch. of Ophth., 1935, v. 14, Sept., pp. 458-463.

The author presents two graphs which show the relationship between diopters and focal distance and the rate at which the diopters change as the distance changes. He emphasizes the need of accuracy in distance to minimize errors in retinoscopy and describes a cord which is divided by beads into lengths representing the various dioptric values. J. Hewitt Judd.

Wilson, J. A. **Ametropia and sex.** Brit. Jour. Ophth., 1935, v. 19, Nov., p. 613.

Of 22,000 school children with defective vision, 57.9 percent were girls. They were arranged in groups as to myopia and hyperopia, and also in age groups, below seven years, seven to ten years, and eleven to fourteen years.

In the age group of 300 children below seven years, eight were hyperopic to one myopic, the hyperopia being as much as 8 D. and the myopia as much as 12 D. Between 7 and 10 years, there were 4.6 cases of hyperopia to one of myopia; from 11 to 14 years, 3 cases of hyperopia to one of myopia; from 15 to 17 years (53 males and 41 females) hyperopia and myopia reached parity. The result of the study may or may not show some relation between amount of study and increase in myopia. Previous studies had indicated that where a father or mother was myopic, that parent transmitted myopia to two girls for one boy. D. F. Harbridge.

Zentmayer, William. **Voluntary control of accommodation.** Amer. Jour. Ophth., 1935, v. 18, Dec., pp. 1134-1136.

4. OCULAR MOVEMENTS

Fisher, E. M. **The technique of tenorrhaphy.** Sovietskii Viestnik Opht., 1935, v. 7, pt. 1, p. 122.

This is a description of a muscle resection operation with one mattress suture through conjunctiva and muscle. Ray K. Daily.

Kahoun, Svatopluk. **Etiology of paralysis of external eye muscles.** Ceskoslovenska Oft., 1935, v. 2, no. 2, p. 96-102.

In the Brno eye clinic, during the years 1929 to 1933, there were 64 cases of paralysis of external eye muscles. The etiology was as follows: lues 12, arteriosclerosis 15, trauma 7, general infections 7, congenital 7, tumor in the base of the cranium and brain 6, tumor in the orbit 2, inflammation of nasal sinuses 2, hemiencephalitis 1, encephalitis 1, ophthalmoplegia (progressive chronic) 1, hemiplegia 1, unknown 2.

Twenty-two percent of these cases were cured; 37 percent were improved; in 41 percent no improvement was obtained. The abducens was most frequently involved, the trochlearis seldom. In more than one-half the cases, more than one nerve were paralyzed at the same time.

Georgiana D. Theobald.

O'Connor, Roderic. **The recession operation—a criticism.** Amer. Jour. Ophth., 1935, v. 18, Dec., pp. 1137-1139.

Pol, W. **Comparative evaluation of the Maddox rod and the Armbruster diploscope in heterophoria.** Klinika Oczna, 1935, v. 13, pt. 3, p. 577.

The Maddox-rod test shows the degree and type of heterophoria, while the diploscope determines only the

type. The diploscope has the merit of demonstrating the presence of binocular vision and fusion. In studying the effect of heterophoria on depth perception the author found that a difference of four degrees in deviation for distance and near, or exophoria of four degrees or esophoria of three degrees for distance, had no effect on depth perception. Ray K. Daily.

5. CONJUNCTIVA

Anelli, Dante. **A preparation of colloidal zinc in the treatment of induced catarrhal conjunctivitis.** Boll. d'Ocul., 1935, v. 14, May, pp. 669-673.

In experiments on rabbits by subconjunctival injection of cultures of staphylococcus, streptococcus, and pneumococcus, followed by deep scarifications of the conjunctiva, instillation of colloidal zinc caused rapid clearing of the conjunctivitis. M. Lombardo.

Charlin, Carlos. **Masked trachoma.** Boll. d'Ocul., 1935, v. 14, May, pp. 609-618.

The author reports twelve cases of an attenuated, benign form of trachoma, manifesting itself either by simple photophobia; by symptoms of chronic catarrhal, follicular, or eczematous conjunctivitis, blepharoconjunctivitis, or relapsing ulcerous keratitis; by ptosis, entropion, and trichiasis; or by an apparently simple dacryocystitis. Some of these symptoms yield readily to copper sulphate. The main differential feature consists in a pannus found upon slit-lamp examination. (4 figures.)
M. Lombardo.

Gowen, G. H. **The dissociative influence of the normal rabbit conjunctiva on beta hemolytic streptococci.** Amer. Jour. Ophth., 1935, v. 18, Dec., pp. 1140-1143.

Khorazo, D., and Thompson, R. **The bacterial flora of the normal conjunctiva.** Amer. Jour. Ophth., 1935, v. 18, Dec., pp. 1114-1116.

Kolacny, Jaroslav. **Local therapy of trachoma with Estaban's vaccine.** Ceskoslovenska Ofth., 1935, v. 2, no. 2, pp. 112-114.

Because Esteban had reported 34 of 42 cases of trachoma cured by use of a vaccine, the author tried this form of therapy in 18 cases of bilateral trachoma. The vaccine was prepared from trachoma granules macerated in physiologic salt solution, kept at 37° C. for 24 hours, then inactivated at 60° C. for a half-hour. The solution was instilled into the conjunctival sac daily for three weeks, and once a week the conjunctiva was well rubbed with a cotton applicator. No improvement was noted that could not be attributed to atropin used where indicated.
Georgiana D. Theobald.

Markiewicz, Stanislaw. **Methyl antigen in the treatment of trachoma.** Klinika Oczna, 1935, v. 3, pt. 3, p. 649.

A report of five cases of trachoma treated successfully with methyl antigen, an antituberculous antigen used in Poland. Ray K. Daily.

Nastri, F. **Purulent conjunctivitis and palpebral pyodermatitis from micrococcus catarrhalis.** Boll. d'Ocul., 1935, v. 14, May, pp. 674-687.

A male child of nine days, luetic, showed facial dermatitis and purulent conjunctivitis. Bacteriologic examination revealed Micrococcus catarrhalis. Excoriations of the skin during delivery with face presentation, and poor general condition, contributed to the rare localization of this germ from the vaginal canal. (Bibliography, 3 figures.) M. Lombardo.

Possenti, G., and Castrignani, G. **Etiology and pathologic anatomy of pterygium.** Ann. di Ottal., 1935, v. 63, Sept., p. 699.

The authors made biomicroscopic and histologic studies on a series of stationary and progressive pterygium. They review in detail the various existing hypotheses, and conclude that the inflammation theory is most acceptable. (One plate, bibliography.)
Park Lewis.

Robbins, A. R. **Role of Bacterium granulosis in trachoma.** Arch. of Ophth., 1935, v. 14, Oct., pp. 629-640.

Over one hundred articles have been written on this subject. The organism was found to be morphologically and biologically unstable. It was difficult to isolate and grow, lost virulence rapidly, and produced few if any antibodies. Noguchi isolated this bacterium from cases of trachoma and with it produced granular conjunctivitis in monkeys. But Lindner and others did not believe this granular conjunctivitis to be identical with trachoma. Experimental transfer of Bacterium granulosis to the human conjunctiva has failed to produce trachoma. The author therefore believes that at present at least Bacterium granulosis cannot be considered the cause of trachoma.

J. Hewitt Judd.

Szer, Rosa, and Zachert, Margan. **A report on the work of the antitrachomatous dispensary of the First Center of Hygiene in Warsaw.** Klinika Oczna, 1935, v. 13, pt. 3, p. 657.

A detailed report of the work accomplished since 1932.

6. CORNEA AND SCLERA

Focosi, M. **Considerations on the pathogenesis of filamentary keratitis.** Boll. d'Ocul., 1935, v. 14, May, pp. 619-640.

In a man of 68 years, a fine filament 4 mm. long, with a large roundish free end and surrounded by a mucous mass, was adherent to the infero-external paracentral sector of the right cornea. Under the microscope its base appeared to be formed by flat round or polygonal cells with abundant protoplasm and round nuclei, while the filament consisted of an amorphous mass including elongated nuclei. A man of 50 years showed a similar filament implanted at the level of a wound in the inferior sector of the cornea. (Bibliography, 5 figures.) M. Lombardo.

Caevich, E. P. **Treatment of corneal lesions by the method of Speranskii.** Sovietskii Viestnik Opht., 1935, v. 7, pt. 1, p. 36.

The author treated twenty corneal lesions with a marked neurotropic component, such as discoid keratitis, corneal herpes, and recurrent erosions, with novocain blocking of the periadrenal tissue according to the method of Vishnevskii. Brief case histories show the favorable effect of the treatment on keratitis with a definite neurotropic factor. The effect was less pronounced in scrofulous keratitis, and there was practically no effect on serpiginous ulcer and fascicular keratitis. The author concludes that this treatment acts by raising the general biologic defences of the body and that it should be used in conjunction with other therapeutic procedures. Ray K. Daily.

Goldfeder, A. E. **The technique of chondroplasty in trachomatous pannus.** Sovietskii Viestnik Opht., 1935, v. 7, pt. 1, p. 131.

The author's operation consists in the implantation of a piece of the auricular cartilage around the limbus. In comparison with Denig's operation the author claims for this procedure greater technical simplicity, greater effectiveness, and better cosmetic appearance.

Ray K. Daily.

Grancini, L. E. **An uncommon form of dendritic keratitis due to streptococcus partially hemolyticus.** Boll. d'Ocul., 1935, v. 14, June, pp. 786-800.

A boy of five months was affected by marked parenchymatous infiltration of the entire right cornea and, near its margin at the nine o'clock meridian, by an oval loss of substance showing branches terminating in other smaller ulcers. The boy had been affected by eczema of the face and by infection of a couple of fingers of the right hand. The cornea recovered under general and local treatment. Cultures, endoperitoneal injection of mice, and inoculation of rabbit cornea with material taken from the boy's eye, face, and fingers indicated that the corneal lesion was due to autoinoculation with a streptococcus partially hemolytic and weakly pathogenic. (Bibliography, 10 figures.) M. Lombardo.

Herbert, H. **The precise origin of corneal pitting.** Brit. Jour. Ophth., 1935, v. 19, Nov., p. 600.

This contribution is to correct the impression that the author "is not in

agreement with the view that follicles are the antecedents of Herbert's peripheral pits." The root cause of pitting however is not thus explained. Clinical developments, ranging up to the deepest trachomatous pits, seem traceable back in some measure to the primary and fundamental influence of relatively small, exceptional, isolated limbal resistances. D. F. Harbridge.

Irvine, A. R. **Some aspects in the treatment of ulcers of the cornea.** Trans. Pacific Coast Oto-Ophth. Soc., 1934, 22nd annual meeting, p. 154.

Three case of corneal ulcer were treated by various procedures. The author emphasizes the effect of overtreatment and of the continued use of local anesthetics. The advantages of foreign protein injections and of the thermophore in selected cases are discussed. The helpfulness of a binocular bandage and of the use of collodion to keep the eyes closed is stressed. (Discussion.)
M. E. Marcove.

Kitaeva, A. **Prognosis and treatment of parenchymatous keratitis.** Sovietskii Viestnik Opht., 1935, v. 7, pt. 1, p. 143.

On the data of 112 cases the author concludes that parenchymatous keratitis never leads to complete blindness, that patients should be hospitalized, and that mercurial inunction is an effective antiluetic measure.
Ray K. Daily.

Klien, B. A. **Acute metastatic syphilitic corneal abscess.** Arch. of Ophth., 1935, v. 14, Oct., pp. 612-617.

A male patient aged 52 years was seen on account of a corneal abscess. The clinical findings were not correctly interpreted and the eye was removed because of pain. Later the patient was found to be luetic. Histologic examination revealed that repair was going on which would at least have led to preservation of useful vision. The corneal and uveal lesions are coördinate manifestations, because Descemet's membrane was found to be intact. The infection of the iris and cornea was probably metastatic. (Photomicrograph.)
J. Hewitt Judd.

Kluever, H. C. **Streptococcal pseudomembranous conjunctivitis.** Amer. Jour. Ophth., 1935, v. 18, Dec., pp. 1094-1108.

Koslowski, Bogumil. **Groenouw's nodular corneal dystrophy.** Klinika Oczna, 1935, v. 13, pt. 3, p. 551.

A woman of 29 years came because of corneal opacities. White nodules were found centrally in the middle and deep corneal layers, and a small number of opaque plaques superficially. The same condition was found in the patient's father, two sisters, and daughter. Three superficial segments of the cornea were excised 4 mm. from the limbus and were covered with conjunctiva in the hope of bringing blood vessels closer to the center of the cornea and stimulating its metabolic processes. Three months later the patient's vision had improved in the right eye from 5/20 to 5/15, and in the left from 5/35 to 5/10. (Review of literature, detailed histologic report, illustrations.)
Ray K. Daily.

Marchesini, E. **The behavior of the scleral canals and their relation to the venae vorticosae at different ages.** Ann. di Ottal., 1935, v. 63, Sept., p. 689.

The author demonstrated thickening and increased density of the connective bundles especially in the deeper strata, based upon rarefaction of a number of fixed connective tissue cells associated with modification of the nuclei such as flattening or elongation. In relation to the canals provided for passage of the venae vorticosae the author was able to demonstrate in an important percentage circumscribed thickening of the pericanalicular tissues with occasional disappearance of perivascular connective tissue, especially in the transcleral portion. (Bibliography.)
Park Lewis.

Marmalevski, K. V. **Surgical treatment of serpiginous ulcer.** Sovietskii Viestnik Opht., 1935, v. 7, pt. 2, p. 256.

Relative to control of pain and to final visual acuity the author obtained better results by covering the curetted ulcer with a conjunctival flap than from any other procedure. Ray K. Daily.

Marquez and Velilla. **On marginal degeneration of the cornea (Terrien's disease).** Arch d'Opht., 1935, v. 52, Oct., p. 707.

Reviewing the literature and describing two new cases of this disease, the author concludes that it is a special degeneration of the peripheral superficial layers of the cornea. This leads to thinning of the cornea, producing a groove in the early stages and an ectasia of the cornea in the last. Considerable astigmatism results. There is danger of rupture of the globe, either traumatic or spontaneous, at times with iris prolapse. The thinning of the cornea is consecutive to failure of nutrition, and this renders cicatrization of the lesion very difficult. (Illustration, bibliography.) Derrick Vail.

Ochapovskii, S. V., and Sharkovskii, I. A. **Pathologic physiology of the cornea.** Sovietskii Viestnik Opht., 1935, v. 7, pt. 1, p. 46.

Brief histories are given of thirteen cases of neuroparalytic keratitis, with a review of the literature relative to various theories on the pathogenesis of the disease. Ray K. Daily.

Parlato, S. J. **Corneal ulcers due to a common allergen.** Arch. of Ophth., 1935, v. 14, Oct., pp. 587-590.

Corneal ulcers occurred in a nun aged 36 years, who was found to be very sensitive to orris root. She also reacted to dionin, the use of which was therefore discontinued. Her duties were changed so that she could avoid orris root preparations, and desensitization was carried out by subcutaneous injections of the root extract. The corneal lesions healed completely in a short time. The author believes the use of dionin contraindicated as a palliative treatment for corneal ulcers, because many allergic and nonallergic persons are sensitive to the drug.

J. Hewitt Judd.

Shapira, T. M. **Lattice type of corneal dystrophy.** Arch. of Ophth., 1935, v. 14, Sept., pp. 387-391.

The findings in previously reported cases are summarized. Three cases which occurred in members of the same family, two sisters and a son of one of them, are described. The condition is well shown in a stereophotograph.

J. Hewitt Judd.

Stastnik, Emanuel. **Treatment of herpes zoster of the eye.** Ceskoslovenska Ofth., 1935, v. 2, no. 2, pp. 114-116.

In treatment of five cases of corneal herpes zoster, in addition to local application of boric ointment and atropin, the author used two grains of sodium thiosulphate (20 percent solution) intravenously. The injections were given daily or every other day, according to the severity of the affection. Four to twenty-two injections were needed in different cases. The author has no theory as to the action of sodium thiosulphate on this disease. Because varicella and herpes appear to be related, he suggests that sodium thiosulphate be used in treatment of both diseases to check his results.

Georgiana D. Theobald.

7. UVEAL TRACT, SYMPATHETIC DISEASE, AND AQUEOUS HUMOR

Friedenwald, J. S., and Pierce, H. F. **Circulation of the aqueous. 4. Reabsorption of colloids.** Arch. of Ophth., 1935, v. 14, Oct., pp. 599-611.

Foreign or native colloids injected into the anterior chamber of the eye were absorbed with extreme rapidity. All such colloids were first actively phagocytized by the surface layer cells of the iris. Monocytes then appeared in the tissues and removed the colloid via the perivascular spaces of the perforating vessels of the sclera. Serum proteins were disposed of in the same manner except that in their removal proteolytic enzymes played a digestive part. This phagocytic activity of the surface cells of the iris is regarded as of importance in keeping the aqueous optically clear, and as explaining the ease of formation of peripheral anterior synechia in glaucoma.

J. Hewitt Judd.

Kuda, M. C. **A clinical and histopathologic study of traumatic cysts of the iris.** Sovietskii Viestnik Opht., 1935, v. 7, pt. 1, p. 117.

One cyst developed in a young student seven years after injury. Its excision was followed by recurrence, which was treated by injection of 3 percent iodine into the cyst after opening it from the limbus. The cyst became obliterated. A rare feature of this case was pressure atrophy of the lens in the region of the original cyst. In the second case a bilobed cyst occurred in a child of six years, two years after injury. Serial sections of the enucleated eye showed that the two lobes intercommunicated. (Photomicrographs.)

Ray K. Daily.

McKee, S. H. **Metastatic ophthalmia in a case of pneumonia: bacteriological findings.** Amer. Jour. Ophth., 1935, v. 18, Dec., p. 1135.

Newton, F. H. **Empirical treatment of uveitis.** Arch. of Ophth., 1935, v. 14, Oct., pp. 618-623.

A comprehensive résumé is given of the usual treatment of acute and chronic uveitis of unknown etiology, including combinations of mydriatics, either by subconjunctival injection or by instillation; foreign proteins, especially typhoid vaccine and whole milk; sodium-gold thiosulphate, intravenously; and the use of heat by diathermy, carbon light bulb, and infrared or "bathroom" electrical heater. The use of ethyl morphine hydrochloride is condemned.

J. Hewitt Judd.

Rumiantzeva, A. **Treatment of sympathetic ophthalmia according to the method of Speranskii.** Sovietskii Viestnik Opht., 1935, v. 7, pt. 1, p. 27.

In pathologic processes Speranskii attributes the chief role to the neurotropic component, and he divides all pathologic processes into two groups. In one the pathologic process is a primary neurotropic disturbance. In the other the initial factor may be infection, trauma, or other cause, with the nervous system becoming involved in the course of the process. After this has taken place recovery can come only from treatment of the nervous system, treatment of the original infection alone being useless. To arrest a pathologic process, according to Speranskii, it is necessary to exclude temporarily some part of the nervous system; this procedure stimulating new nerve associations during the formation of which the original pathologic process is arrested. Speranskii proposed novocaine blocking of the sympathetic in the region of the waist-line as the most effective approach to the neurotropic system. The author applied novocaine blocking in the periadrenal tissue to two acute and four chronic cases of sympathetic ophthalmia. Six complete case histories show the impressive effect of the treatment in the two acute cases. Such rapid and complete recovery could not be obtained with any other type of treatment. There was some improvement in the chronic cases, but permanent ocular changes with severe disturbance of function precluded any considerable improvement.

Ray K. Daily.

8. GLAUCOMA AND OCULAR TENSION

Beckh, Walter. **A case of spontaneous glaucoma in a rabbit.** Amer. Jour. Ophth., 1935, v. 18, Dec., pp. 1144-1145.

Beckh, Walter. **Syphilis and primary glaucoma.** Amer. Jour. Ophth., 1935, v. 18, Dec., pp. 1129-1134.

Cavaniglia, Alfredo. **Clinical researches on the use of pilocarpin collyria of high concentration.** Boll. d'Ocul., 1935, v. 14, June, pp. 801-822.

Tests were made on normal and hypertonic eyes with a six percent solution of pilocarpin hydrochloride. In eyes affected by all forms of primary glaucoma a six percent solution is well tolerated and it never provokes general toxic symptoms. The author thinks this strength may be employed advantageously in ophthalmic practice. (16 figures.)

M. Lombardo.

Joseph, Etienne. **Late results of operations for glaucoma.** Ann. d'Ocul., 1935, v. 172, Oct., pp. 827-848.

Of 650 cases gathered from the various Parisian institutions, 196 were followed for from two to nine years. In acute glaucoma a better result was ob-

tained with iridectomy than with sclerecto-iridectomy. For chronic simple glaucoma the Lagrange and Elliot operations were done. Cyclodialysis and iridencleisis were seldom performed. Out of 144 cases the operative results from the standpoint of control of tension were as follows: Of 133 sclerecto-iridectomies 20 failed. Of 12 iridectomies 7 failed. Of 6 cyclodialyses 4 failed. John C. Long.

Klauber, E. **Glaucomatous cupping without glaucoma.** Ceskoslovenska Ofth., 1935, v. 2, no. 2, pp. 93-96.

In 1926, at the age of 34 years, a man who was a great smoker complained of a shadow in front of his left eye. The vision of either eye was 6/9, and the eyes appeared in every way normal except for a hyperemia of the vessels of the optic disc. Again seen in 1934, both discs showed typical glaucomatous cupping, and vision was barely 6/9 in the right eye and 6/12 in the left. The tension never reached over 15 mm. The fields were narrowed; and scotomas spread temporally from the blind spot. The author thinks the condition may have been due to an affection of the hypophysis (of which there are no other symptoms) or to an affection of the veins in the optic nerve. Georgiana D. Theobald.

Perera, C. A. **Bilateral buphthalmos associated with nevus flammeus.** Arch. of Ophth., 1935, v. 14, Oct., pp. 626-628.

This rare condition occurred in a white girl aged fourteen months. Vascular nevus covered most of the face, including all of the lids, scalp, and right side of the body. The corneas were enlarged and the optic discs showed moderate cupping. The intracranial calcification was thought to indicate intracranial hemangiomas. Trephining with peripheral iridectomy reduced the tension to within normal limits in each eye. J. Hewitt Judd.

Posner, Adolph. **A checking station for tonometers.** Arch. of Ophth., 1935, v. 14, Sept., pp. 453-457.

This station was recently established at the Herman Knapp Memorial Eye Hospital. Tonometers are checked as to standard measurements of the parts, and are compared with a master Schiötz tonometer by means of a water manometer, which is here illustrated by a drawing. (Discussion.) J. Hewitt Judd.

Rabinovich, M. G. **Amyl nitrite in the treatment of primary glaucoma.** Sovietskii Viestnik Opht., 1935, v. 7, pt. 2, p. 181.

Ten cases of acute, two of chronic inflammatory, and four of simple glaucoma were treated with inhalations of amyl nitrite. In thirteen cases the tension fell and vision rose. The author considers amyl nitrite a powerful agent for checking an acute glaucomatous attack preparatory to operative interference. Ray K. Daily.

Rabinovich, M. G. **Zirm's iridectomy.** Sovietskii Viestnik Opht., 1935, v. 7, pt. 2, p. 175.

A tabulated report of the immediate results of 54 operations.

Redslob, E., and Reiss, P. **Action of pH of the medium on the state of swelling of the vitreous body.** Ann. d'Ocul. 1935, v. 172, Oct., pp. 848-851.

The volume changes at different hydrogen-ion concentrations were determined for fresh beef vitreous. The vitreous was measured in a pyknometer and a known volume of physiologic salt salt solution of definite pH was added. Volume readings were made at intervals. In general there was swelling of the vitreous with decrease in pH. The volume change was reversible on placing the vitreous in physiologic salt solution. John C. Long.

Uribe Troncoso, M. **Closure of the angle of the anterior chamber in glaucoma.** Arch. of Ophth., 1935, v. 14, Oct., pp. 557-586.

With the gonioscope the author has observed the angle of the anterior chamber during different stages of glaucoma. He reports in three series on 87 glaucomatous eyes. Study of 26 eyes with primary congestive glaucoma, 34 eyes with simple glaucoma, and six eyes with simple glaucoma with subacute exacerbations, leads him to con-

clude that at the beginning of an attack the angle is open but if the attack persists or relapses occur the angle may become closed. In simple glaucoma the angle was usually open, proving that peripheral synechiae are the result and not the cause of hypertension. The extent and depth of peripheral synechiae had no correspondence with size and shape of the pupil or the height of the ocular tension. The action of the iridectomy was studied. In four cases of simple glaucoma the angle was entirely open and remained open after iridectomy lowered the tension. In many cases iridectomy lowered tension and improved vision even when the angle remained totally closed. The author believes the iridectomy works (1) by providing a large aperture between the chambers, thus equalizing pressure and allowing better circulation of liquids; (2) in some cases by freeing peripheral synechiae, thereby reopening normal outlets; (3) by relieving pressure on the veins of the iris and ciliary processes, thus permitting larger absorption of aqueous. He feels that fistulizing operations should be confined to cases in which the angle is entirely closed or in which iridectomy has failed. Ten cases of simple glaucoma with open angle were studied before and after iridencleisis. The angle was found entirely closed after the operation in six cases, and in two others the synechiae progressed from partial to corneal. (Drawings.) J. Hewitt Judd.

Wilczek, Marjan. **Experimental studies in rabbits on the role of the choroid in ocular tension and on retinal permeability to crystalloids, after elimination of the iris and ciliary body.** Klinika Oczna, 1935, v. 13, pt. 3, p. 587.

The circulation of the anterior segment of the eyeball was eliminated by circular electrocoagulation 2 mm. from the limbus. After this fluorescein injected intravenously and potassium iodide injected subcutaneously did not reach the anterior chamber. The anterior chamber became filled with a fluid emanating from the vitreous. The effect of the following was then investigated: tying and section of the venae vorticosae, pressure on and section of the veins of the neck and aorta, subconjunctival injections of adrenalin and hypertonic salt solution, and section of the ocular muscles. Intravenous injection of hypertonic salt solution caused a marked fall in intraocular tension. Changes in the crystalloid osmotic structure of the blood had no influence on permeation of strychnin from the vitreous into the blood. The retina was found permeable to strychnin and fluorescein. Ray K. Daily.

Wittels, Ludwig. **Edema of the cornea and development of an intracorneal cyst following rupture of Descemet's membrane in an eye with absolute glaucoma.** Klinika Oczna, 1935, v. 13, pt. 3, p. 543.

A detailed description is given of the clinical and histological findings of this case. The author explains its pathogenesis by the following sequence: absolute glaucoma, degenerative keratitis, perforation of the cornea, reduction of tension, and healing with corneo-lenticular synechia; secondary rise of tension, rupture of synechia with Descemet's membrane adhering to the anterior capsule of the lens; edema of the cornea with development of a cyst in the scar. (Illustrations.)

Ray K. Daily.

9. CRYSTALLINE LENS

Anthony, Marc. **The choice of an intracapsular operation by the average oculist.** Trans. Pacific Coast Oto-Ophth. Soc., 1934, 22nd annual meeting, p. 187.

The Verhoeff intracapsular technique is the operation of choice for those who do not have extensive surgical practice. In 64 cases operated on by this method, 85 percent of the lenses were removed with their capsules intact. In the remaining 15 percent the ruptured capsule was removed after the lens was expressed. Vitreous was lost in 8 percent of the cases. (Discussion.)

M. E. Marcove.

Bellavia, A., and Mirto, F. **Glycemia and glycohydria in senile cataract, and glycohydria and glycophakia in experi-**

mental traumatic cataract. Boll. d'Ocul., 1935, v. 14, June, pp. 823-838.

Hyperglycemia was found in only 5 out of 23 patients affected by senile cataract, so the writers do not agree that any relation exists between the two diseases. In experimental traumatic cataract in rabbits they found the amount of glucose greater in the cataractous lens than in the clear lens of the same rabbit; and they attribute this condition to decrease in glycolytic power of the cataractous lens. (Bibliography.) M. Lombardo.

Campos, R. **Clinical and histologic researches on punctate cataract.** Boll. d'Ocul., 1935, v. 14, May, pp. 688-702.

In a woman of 47 years the left eye was found affected by a choroidal melanoma and both lenses showed disseminated punctiform opacities. Microscopic examination of the lens of the enucleated eye showed in the deep anterior cortex numerous fusiform or ellipsoid formations with their long axis parallel to the surface of the lens, and in size from 0.05 to 0.2 mm. Near the equator of the lens some fibers had undergone degenerative changes similar to those described in incipient subcapsular senile cataract. (Bibliography, 4 figures.) M. Lombardo.

Lugli, L. **Late traumatic rosette cataract.** Arch. of Ophth., 1935, v. 14, Sept., pp. 392-407.

The author reviews the literature and presents six cases which confirm Vogt's theory that the initial opacity forms in the anterior cortex and that it is traumatic in origin. The rosette cataract is stationary, but through unbalancing of the physiologic nutrition of the lens other lens fibers may become involved. (Six drawings.) J. Hewitt Judd.

O'Brien, C. S. **Detachment of the choroid after cataract extraction.** Arch. of Ophth., 1935, v. 14, Oct., pp. 527-540.

From a study of 75 cases of choroidal detachment following uncomplicated cataract extraction it is concluded that such detachments almost invariably occur at the time of operation; the complication being due to reduction of intraocular pressure with subsequent congestion of the uveal vessels and rapid and exaggerated transudation of fluid from the thin-walled veins of the ciliary body and anterior choroid into the normal perichoroidal space. Large detachments were found to follow delayed closure or rupture of the operative wound. Reattachment invariably occurred, and the fields and central vision were unaffected. Treatment other than promoting closure of the wound was unnecessary. (Photomicrographs.) J. Hewitt Judd.

10. RETINA AND VITREOUS

Biontovskaja, E. G. **Retinal tuberculosis.** Sovietskii Viestnik Opht., 1935, v. 7, pt. 1, p. 78.

Extensive retinal edema and periphlebitis occurred in a woman of 23 years, with a positive Mantoux reaction. Ray K. Daily.

Borochovich, S. I. **Therapeutic effect of retrobulbar injections of atropin in embolism of the central retinal artery.** Sovietskii Viestnik Opht., 1935, v. 7, pt. 2, p. 149.

In two cases which the author considered as of true embolism, vision was restored after such injections. In a third case of sudden blindness which the author attributed to endarteritis atropin injections were ineffectual. Ray K. Daily.

Caocci, G. **Contribution to knowledge of familial macular degeneration.** Boll. d'Ocul., 1935, v. 14, May, pp. 717-735.

A son and a daughter aged eighteen and fifteen years respectively, only living children among eight born from consanguineous parents, had become affected by nyctalopia and marked reduction of vision, each at the age of eight years, while the visual fields were normal for form and colors, without central scotoma. Hereditary lues was excluded. Examination of the fundi revealed typical symmetric changes of familial degeneration of the macular and perimacular regions. (Bibliography, 2 color pictures of fundus.) M. Lombardo.

Hesky, Mario. **The origin of the pigment encountered in the choroid around latent holes and corresponding with holes in detached retina, etc.** Boll. d'Ocul., 1935, v. 14, May, pp. 736-745.

From three cases of retinal detachment the writer concludes that the pigment observed on the choroid in correspondence with an opening in the retina is a vitreous pigment attracted by the denuded choroid together with the fluid of vitreous origin in the subretinal space. (Bibliography.)

M. Lombardo.

Hesky, Mario. **Recovery by conservative treatment of retinal detachment upward with large tear.** Boll. d'Ocul., 1935, v. 14, June, pp. 777-785.

A man of 36 years, highly myopic, showed a large detachment in the upper temporal quadrant of the right eye with a large tear in its lower part. Erect head slightly tilted to the left both in sitting position and during sleep was prescribed with the use of a pinhole disc in front of the good eye. The patient came to the clinic twice a week for re-examination. At the end of three months the retina was reattached. Rotatory movements of the eyeball must be avoided to obtain spontaneous recovery. Sitting position and erect head are indicated if the tear is located upward, in order to facilitate settling of retroretinal fluid and to allow the tear to approach the choroid. If the tear is located laterally the head is to be tilted in a direction opposite to the tear.

M. Lombardo.

Kadlicky, Roman. **Further results of surgical treatment of detached retina.** Ceskoslovenska Ofth., 1935, v. 2, no. 2, pp. 71-78.

Forty-five cases of detached retina were operated on at Czech Eye Clinic in Prague, during the twelve months ending March, 1934. Recovery was obtained in 25 cases (56 percent). The author not only closes the hole in the retina, but also builds a wall between the normal and the diseased retina by means of a series of electrocoagulating punctures. He uses a needle whose 2-mm. point is bent at right angles. This needle is so insulated with rubber tubing that only the bent point is free. The author devised an electrode of stainless steel to prevent oxidation. He divides the results of the operations into two groups, cured and not cured. For prognosis he compares these two groups with each other from different points of view. All cases of less than one week duration were cured. There were more emmetropic and slightly myopic cases among the cured, whereas of the unsuccessful the majority were greatly myopic. The age of the patient had no influence on the result of the operation. Single tears were more frequent in the cured cases, multiple tears more frequent in others. The tears were found mostly in the temporal half, and were of equal frequency in the upper and lower quadrants. Exceptionally they were found in the lower nasal quadrant, never in the upper nasal. The width of the detachment is of great importance for prognosis. In complete detachment the prognosis is poorer than in partial, without consideration of duration. In some cases detachment was complete within two weeks, in some a partial detachment continued for seven months.

Georgiana D. Theobald.

Knobloch, Rudolf. **Filtration of subretinal fluid after electrocoagulation puncture of the sclera.** Ceskoslovenska Ofth. 1935, v. 2, no. 2, pp. 79-86.

Detachment of the retina with tears was produced experimentally in rabbit eyes. The puncture was made with electrodes devised by the author. For the filtration experiment, physiologic salt solution with methylen blue was injected under pressure which could be measured accurately. The author watched cases up to 37 days at intervals of 6 hours, and observed that: (1) the filtrability of the electrocoagulating punctures, under physiologic pressure, did not last longer than three days, while after trephining (1.5 mm.) the filtration could be demonstrated even four weeks later. (2) Filtration from electrocoagulating punctures under physiologic pressure could be demonstrated 6, 48, and 72 hours after coagu-

lation, while after 24 and 96 hours filtration was possible only under high pressure (nonphysiologic). This is explained by primary closure of the canal during the first 24 hours being followed by opening of the canal during the next 24 hours as a result of a diminished swelling of the edges. Ninety-six hours after coagulation the opening appeared to be partially closed by connective tissue. (3) Extrusion of necrotic scleral tissue could not be found in any case. (4) If the single discs of the coagulated sclera are contiguous rupture of the sclera may be produced which, in turn, may cause a prolonged continuous filtration. In cases in which the small discs are separated from each other a minimal distance of 1 mm., no rupture of the sclera will arise. (5) If the coagulation discs encircle an area of sclera, sloughing may occur, and this may result in long continued filtration similar to that of trephining.

Georgiana D. Theobald.

Kravitz, D., and Lloyd, R. I. **Dilated and tortuous retinal vessels. Report of a case of congenital arteriovenous communication.** Arch. of Ophth., 1935, v. 14, Oct., pp. 591-598.

A woman aged 32 years, without ocular symptoms, was found to have in the right eye retinal arteries and veins five or six times the average size. At the lower periphery a definite arteriovenous communication was discovered. The vision was 20/20 and the fields normal. The condition was thought to be congenital. Angiomatosis retinae (Hippel's disease) and Lindau's disease, as well as other types of short circuit in retinal vessels, are discussed. (Bibliography.)

J. Hewitt Judd.

Parchamenko, M. E. **Ocular changes in thrombopenia.** Sovietskii Viestnik Opht., 1935, v. 7, pt. 2, p. 244.

In a man, aged 25 years, a left retinal hemorrhage was the first symptom. The diagnosis was made from blood study and capillaroscopy. After x-ray therapy of the spleen the hemorrhages were absorbed and vision was restored to normal.

Ray K. Daily.

Pascheff, C. **The true conception of operative cure of retinal detachment; the sealing of the tear or drainage and provoked adhesions.** Arch. d'Opht., 1935, v. 52, Oct., p. 717.

The author believes that retinal tears are secondary to detachment, differing thus from Gonin, Vogt, and others. Nature cures the detachment by absorption of the subretinal fluid and cicatrization. Therefore surgery should follow the same concept. The author's technique is to denude the sclera over the affected area, without bothering about the tear. Then he does a double trephining down to the choroid corresponding to the greatest area of detachment and on two sides of the rectus muscle. The choroid is then punctured with the diathermic needle and electrocoagulated to provoke adhesions. Two fistulas are thus created, separated from each other by the corresponding rectus muscle, which by its contraction helps adhesion of the two membranes. The conjunctiva is then sutured. Two cases of successful outcome are reported. It is pointed out that for a successful result the detachment must be very recent. (Illustration, bibliography.)

Derrick Vail.

Savin, L. H. **Atypical retinitis pigmentosa associated with obesity, polydactyly, hypogenitalism, and mental retardation (the Laurence-Moon-Biedl syndrome).** Brit. Jour. Ophth., 1935, v. 19, Nov., p. 597.

Night blindness was first complained of at nine years and was first observed at seventeen years. A family tree of three generations is illustrated. All members were healthy and held good positions except three members of the third generation, one sister and two boys, who were affected. One boy and one girl died young: both showed supernumerary fingers and toes. The remaining boy is the subject of this contribution. An illustration of the patient, two photomicrographs, and a diagram of the family tree accompany the paper.

D. F. Harbridge.

Sharkovskii, I. A., and Martinov, V. F. **A rare form of retinal hemorrhage in**

malaria. Sovietskii Viestnik Opht., 1935, v. 7, pt. 1, p. 76.

A patient aged 23 years had quotidian malaria with retinal hemorrhage, metrorrhagia, purpura and ecchymosis, greatly prolonged clotting time, and a shortened blood-sedimentation time.

Ray K. Daily.

Slavik, B. **Treatment of detached retina.** Ceskoslovenska Ofth., 1935, v. 2, no. 2, pp. 65-71.

During one year, 25 cases of detached retina were operated on. Seven cases (28 percent) were successful; five of these had peripheral tears; two were without tears. Lindner's method was used in two cases without success. The Guist-Lindner method, used in nine cases, was successful in three. Diathermy punctures and Safar's electrodes were used on other cases. The hope of a successful operation is based on: (1) discovery of the tear and its exact location; (2) recent detachment; (3) small region of detachment.

Hope is lessened by: (1) conditions which render difficult localization of the tear (opacity in cornea, lens, or vitreous); (2) absence of tear; (3) complete detachment and long duration (funnel-shaped detachment; formation of connective tissue in retina and vitreous); (4) serious complications following accidents and illness, as opacity of the vitreous, complicated cataract, and great hypotension.

Georgiana D. Theobald.

Strampelli, B. **Diathermic diaphanoscopy.** Boll. d'Ocul., 1935, v. 14, May, pp. 665-668.

If a tear of a detached retina is seen with the ophthalmoscope, it is possible to locate the same tear on looking through the dilated pupil if a transilluminator is applied at the corresponding part of the sclera. The writer describes his modification of Lange's scleral lamp so that it may act as a diathermic electrode by means of a small cup perforated at its center and connected with the illuminating end. With this instrument diascleral coagulation is obtained at the site of the retinal tear. (One figure.)

M. Lombardo.

Takats, G. de, and Gifford, S. R. **Cervical sympathectomy in retinitis pigmentosa.** Arch. of Ophth., 1935, v. 14, Sept., pp. 441-452.

After eleven sympathectomies on six patients, not one showed increase in vision or visual fields. No progress of the disease was noticed during the period of observation, eight to eighteen months. The authors believe that the best method is excision of the superior cervical ganglion with stripping of the carotid sheath. Further studies are indicated as to the effect on dark adaptation and minimal light perception.

J. Hewitt Judd.

Whalman, H. F. **Preretinal artery.** Arch. of Ophth., 1935, v. 14, Sept., pp. 481-482.

The case of a man aged 21 years, in whom a preretinal artery was found in each eye, is reported and is illustrated by two drawings. J. Hewitt Judd.

Wilczek, Marjan. **Experimental studies in rabbits on the role of the choroid in ocular tension and on retinal permeability to crystalloids, after elimination of the iris and ciliary body.** Klinika Oczna, 1935, v. 13, pt. 3, p. 587. (See Section 8, Glaucoma and ocular tension.)

11. OPTIC NERVE AND TOXIC AMBLYOPIAS

Avgushevich, P. L. **Ocular complications in the treatment of malaria with plasmocide.** Sovietskii Viestnik Opht., 1935, v. 7, pt. 1, p. 71.

One case of optic neuritis and two of optic atrophy were caused by excessive doses of plasmocide.

Ray K. Daily.

Carroll, F. D. **Analysis of fifty-five cases of tobacco-alcohol amblyopia.** Arch. of Ophth., 1935, v. 14, Sept., pp. 421-434.

The findings are summarized as to incidence, symptomatology, pathology, etiology, treatment, and prognosis. The great variability in the normal course of the disease renders proper evaluation of any treatment difficult, but the relation of abstinence to improvement was usually striking. Cases are cited, however,

in which patients improved without markedly decreasing the amount of tobacco and alcohol used. (Ten tables.)
J. Hewitt Judd.

Kosmin, V. I. **Optic atrophy caused by plasmocide, and its treatment with retrobulbar injections of atropin.** Sovietskii Viestnik Opht., 1935, v. 7, pt. 1, p. 73.

The author reports six cases of toxic amblyopia caused by plasmocide. Five were treated by retrobulbar injections of 0.1 percent atropin, with a permanent improvement of visual acuity in all cases, and enlargement of the form field in four. Ray K. Daily.

12. VISUAL TRACTS AND CENTERS

Dvorjetz, M. A. **Epidemic encephalitis and the organ of vision.** Ann. d'Ocul., 1935, v. 172, Oct., pp. 852-854.

380 cases of epidemic encephalitis were studied in reference to neurologic eye lesions, thirteen to fourteen years after the acute illness. In 5.6 percent of the cases the eyes were normal. The nuclei of the external ocular muscles were involved most frequently, and multiple ocular palsies were commoner than single lesions. Disturbances of associated movements were demonstrated in 44.6 percent. Uniocular diplopia was seen occasionally. Lesions of the optic nerves and visual pathways were found. There seemed to be no correlation between the severity of the acute illness and the presence of postencephalitic ocular changes. These cases demonstrate that the convergence center is located in the nuclei of the third nerve.
John C. Long.

Globus, J. H., and Silverstone, S. M. **Diagnostic value of defects in the visual fields and other ocular disturbances, associated with supratentorial tumors of the brain.** Arch. of Ophth., 1935, v. 14, Sept., pp. 325-386.

A clinical and anatomic survey of 171 verified supratentorial brain tumors revealed that only in a very small percentage of cases were perimetry and ophthalmoscopy of aid in localization or in determining the type of growth. The tumors are classified into twenty groups, and the findings in each are shown by perimetric charts and tables. The findings are again considered as to papilledema, optic atrophy, visual acuity, scotomas, pupillary manifestations, and disturbances of the intrinsic and extrinsic muscles. Characteristic field defects, when obtained, are of immense diagnostic service. Atypical findings may result from indirect pressure or from selective infiltration of the tumor. A Kennedy syndrome was found only once in forty cases with frontal and prefrontal tumors. (Drawings, photographs.) J. Hewitt Judd.

13. EYEBALLS AND ORBIT

Brunton, C. E. **Studies in exophthalmos.** Jour. of Physiology, 1935, v. 84, June 18, p. 334.

The amount of proptosis was studied by the author in dogs and cats by injecting ephed-hydrochloride and epinin intravenously. The degree of protrusion of the globe and of retraction of the lids was studied by means of an instrument placed on the cornea between the lids, and readings were made on a smoked drum. In most cases there was retraction of the nictitating membrane and of the eyelids, with slight dilatation of the pupil. The author considered a protrusion of 2.25 mm. as representing true proptosis. This occurred in only one of 36 cases. The exophthalmos persisted after the blood pressure had returned to normal.
M. E. Marcove.

Code, C. F., and Essex, H. E. **The mechanism of experimental exophthalmos.** Amer. Jour. Ophth., 1935, v. 18, Dec., pp. 1123-1128.

Hale, Fred. **The relation of vitamin A to anophthalmos in pigs.** Amer. Jour. Ophth., 1935, v. 18, Dec., pp. 1087-1092.

Lubimov, A. A. **Ocular involvement in gangrene.** Sovietskii Viestnik Opht., 1935, v. 7, pt. 1, p. 126.

A woman 21 years of age had an extensive cicatrix of the face involving the lids, and a bony defect of the lower orbital margin, all caused by a necrotic process at the age of seven years. Fur-

ther examination showed that the process had destroyed the inner structures of the nose and also the soft and hard palate. It was attributed to external infection and defective nutrition. (Illustrations.) Ray K. Daily.

Wagner, R. **Orbital abscess following extraction of tooth.** Ceskoslovenska Ofth., 1935, v. 2, no. 2, pp. 117-119.

Two days after extraction of an abscessed left molar tooth, a twelve-year-old boy developed an orbital abscess on the same side, with general fever. After treatment with diathermy and milk injections, the abscess was opened and the orbit returned to normal in a short time. Streptococci were found in the pus. Georgiana D. Theobald.

Wieczorek, Anton. **The bony structure of the orbit.** Klinika Oczna, 1935, v. 13, pt. 3, p. 538.

The author continues his study on the relation of the shape of the nose to the osseous structure of the orbit. The inner orbital walls are more convergent in skulls with flat large noses than in those with high narrow noses. Variations in the structure of the inner orbital wall serve to make the size of the orbit independent of the shape of the nose. Ray K. Daily.

Zitowskii, M. L. **Orbitocranial hernias.** Sovietskii Viestnik Opht., 1935, v. 7, pt. 2, p. 249.

A meningocele in the upper inner portion of the orbit was excised and the osseous opening filled with costal cartilage. The patient, a girl of seventeen years, made an uneventful recovery and there was no recurrence.

Ray K. Daily.

14. EYELIDS AND LACRIMAL APPARATUS

Halbertsma, K. T. A. **True congenital distichiasis.** Arch. d'Opht., 1935, v. 52, Oct., p. 738.

A 37-year-old storekeeper complained of recurrent wild eyelashes. Both eyeballs were inflamed. The margins of each lid showed a double row of cilia, the posterior ones finer, 2 or 3 mm. long, and rubbing the globe. A small piece of the right upper lid, removed for histologic study, showed multilobular meibomian glands surrounding the hair roots. (Illustrations, bibliography.)

Derrick Vail.

Jablonska, Zofja. **A study of the material of the Warsaw University eye clinic relative to the pathogenesis and therapy of dacryocystitis.** Klinika Oczna, 1935, v. 13, pt. 3, p. 520.

On the basis of tabulated bacteriologic study of 134 cases, and 25 brief clinical histories, the author concludes that dacryocystitis is a disease of poverty, more frequent among women than men, and more frequently involving the left lacrimal sac. The relation of dacryocystitis to nasal pathology is shown by bacteriologic and clinical findings. Conservative treatment, consisting of irrigation with rivanol, optochin, lipiodol, zinc sulphate, and silver nitrate, is effective in children and in early cases, particularly in pneumococcus infections. Most chronic cases ended with excision of the lacrimal sac. The author regards dacryocystorhinostomy, with which the clinic has not had sufficient experience, as a technically difficult procedure. Ray K. Daily.

James, W. M. **The lysozyme content of tears.** Amer. Jour. Ophth., 1935, v. 18, Dec., pp. 1109-1113.

Lyzinskii, G. F. **Comparative evaluation of plastic marginal operations.** Sovietskii Viestnik Opht., 1935, v. 7, pt. 1, p. 137.

The objections to transplantation of skin into the intermarginal space are: the presence of fine hairs which may be as irritating as in trichiasis; xerosis and maceration of the transplant; and unsatisfactory cosmetic appearance. Transplantation of mucous membrane of the lip into the intermarginal space is very effective for trichiasis and entropion, and is satisfactory cosmetically. Its disagreeable feature is the pain in the lip during healing. Transplantation of auricular cartilage into the intermarginal space is technically simple and cosmetically satisfactory, but the primary result is not perma-

nent because the implant shrinks rapidly, and hence the trichiasis recurs.
Ray K. Daily.

Marucci, Luigi. **A palpebral pseudohorn.** Boll. d'Ocul., 1935, v. 14, June, pp. 852-868.

A boy of thirteen years showed in the middle of the right lower lid a neoformation that clinically had the aspect of a horn. Histologically, however, it proved to be formed of a cortical epithelial section, which at its base continued the normal epithelium of the lid; and a medullary section formed by an inflammatory infiltration that reached to the tarsus, taking the aspect of a typical granuloma containing meibomian gland. The neoformation had originated from a chalazion which had opened through the skin. (Bibliography, 6 figures.) M. Lombardo.

Panico, E. **Biomicroscopy of the orifices of the ducts of the lacrimal gland.** Boll. d'Ocul., 1935, v. 14, June, pp. 768-773.

These orifices are situated along a line concave toward the cornea. They are surrounded by conjunctival epithelium which here has a pearly-gray color. In chronic pathologic conditions of the conjunctiva they may be distorted or vary in size. (Bibliography, 6 figures.) M. Lombardo.

Riser, R. O. **Dacryostenosis in children.** Amer. Jour. Ophth., 1935, v. 18, Dec., pp. 1116-1122.

Szymanski, J. **Sapiranga.** Klinika Oczna, 1935, v. 13, pt. 3, p. 581.

Sapiranga is a chronic, bilateral, ulcerative destructive blepharitis, endemic in Brazil. It is probably of mycotic origin, with the principal focus of infection in the meibomian glands. Potassium iodide is a specific remedy for the disease. (Illustrations.)
Ray K. Daily.

15. TUMORS

Bucalossi, Antonio. **Sarcoma of the optic disc.** Ann. di Ottal., 1935, v. 63, Sept., p. 676.

The author observed a case of pigmented sarcoma of the optic disc propagated from the choroid and extending through a small perforation of the lamina cribrosa a short distance into the optic nerve. The origin of the neoplasm was shown clinically and histologically by pigment cells on the lamina cribrosa. Park Lewis.

Colombo, Giuseppe. **Melanotic sarcoma of the choroid with nonpigmented palpebral metastasis in a girl of three years.** Boll. d'Ocul., 1935, v. 14, June, pp. 839-851.

Histologic examination of the enucleated eye showed an abundantly pigmented mass developed from the entire choroid. Four months later a nonpigmented sarcoma was removed from the upper lid. (Bibliography, 6 figures.)
M. Lombardo.

Filippi-Gabardi, E. **Xeroderma pigmentosum with ocular lesions.** Boll. d'Ocul., 1935, v. 14, May, pp. 703-716.

A young man of seventeen years who had been affected by xeroderma pigmentosum after an attack of measles at the age of four years, had also shown since the age of eight years a neoformation of the size of a pea on the conjunctiva of the right eye. During the last two months this growth had shown rapid development, covering as a reddish hard mass the anterior segment of the eye and protruding out of the palpebral aperture. It had developed itself at the expense of the cornea, and extended down to Descemet's membrane. Histologically it appeared to be an epithelioma with spindle, oval, and round cells. (Bibliography, 11 figures.)
M. Lombardo.

Kahoun, Svatopluk. **Metastatic carcinoma in the eye and optic nerve.** Ceskoslovenska Ofth., 1935, v. 2, no. 2, pp. 107-111.

Eight years after removal of a breast for carcinoma, a 55-year-old female developed metastasis in the right eye. She presented herself at the hospital with what appeared like a simple detachment of the retina. After a Guist operation,

tension increased. The eye was enucleated on account of pain. Histologic examination showed infiltration of retina, optic nerve, and choroid with cancer cells. Georgiana D. Theobald.

Kurz, Jarmomir. **Unusual course of sarcoma of the choroid.** Ceskoslovenska Ofth., 1935, v. 2, no. 2, pp. 103-106.

In June, 1931, a 35-year-old man, with pulmonary tuberculosis, complained of poor vision in the right eye. To the temporal side of the macula was seen a discrete chorioretinal lesion, which was attributed to tuberculosis. A year and a half later, the lesion appeared the same, except for a very small detachment anterior to it. February, 1932, the man had a pulmonary hemorrhage. He was then at another clinic, where the fundus lesion was diagnosed as "a fresh tuberculous central chorioretinitis." In September, 1933, the fundus picture was entirely changed, the retina was detached, its vessels dilated and tortuous, and several hemorrhages visible. Histologic examination showed two separate mixed-cell (spindle, round, and pigment) tumors. The author considered one metastatic to the other. Georgiana D. Theobald.

Mossa, G. **Reticuloma of the orbit.** Boll. d'Ocul., 1935, v. 14, June, pp. 869-886.

A man of 32 years had had intense pain in the left orbital and frontal regions for two months. The corresponding eye had been progressively protruding and its visual power rapidly decreasing for three weeks. There was papilledema with enlarged retinal veins. X-ray examination revealed a shadow in the orbital region. The orbit was exenterated and a vascular neoplastic mass adherent to the bone was removed. From its histology the author classifies the tumor as a reticuloma. (Bibliography, 2 figures.)

M. Lombardo.

Orr, H. C., and Johnston, I. L. **Thyroid carcinoma with metastasis in the ciliary body.** Brit. Jour. Ophth., 1935, v. 19, Nov., p. 593.

A carcinoma occupied the outer two-thirds of the ciliary body. A small lump had been present in the thyroid gland for eight years. Comparative microscopic study of sections from the eye and thyroid mass showed similarity of cells. The authors were unable to find in the literature a case of carcinoma of the ciliary body secondary to such a growth of the thyroid. (3 photomicrographs.) D. F. Harbridge.

Orzalesi, F. **A case of primary glioma of the iris.** Boll. d'Ocul., 1935. v. 14, May, pp. 641-664.

A girl of twelve years showed a pinkish, irregularly triangular neoformation in the lower temporal quadrant of the left iris. Its apex protruded into the pupillary area and its anterior surface was in contact with the posterior surface of the cornea. The tension of the eye was normal. The tumor was removed through a sclerocorneal incision. Eight months later, under X-ray treatment, the eye did not show relapse, while vision remained 5/10. Histologically the tumor was a glioma. (Bibliography, 10 figures.)

M. Lombardo.

16. INJURIES

Anelli, Dante. **A case of pneumophthalmos.** Boll. d'Ocul., 1935, v. 14, June, pp. 774-776.

Soon after being struck on the right eye by a piece of stone a middle-aged working man noticed black spots in front of this eye. There was a linear wound 1 mm. long in the lower outer quadrant of the cornea; and through a corresponding defect in the iris the anterior lens capsule was seen to be torn and the lens matter opaque. Ophthalmoscopic examination showed intraocular hemorrhage below, a wound in the macular region, and three air bubbles in the upper part of the fundus. X ray did not reveal an intraocular foreign body. (Bibliography, 2 figures.)

M. Lombardo.

Bickerton, R. E. **New cases of war blindness due to mustard gas.** Brit. Med. Jour., 1934, v. 2, Oct. 27, p. 769.

The author reports seven cases gassed during the World War and still

suffering intensely with progressive loss of already much impaired vision. The conjunctivas, especially of the lower fornices, are as irritable and inflamed today as they were after the acute effects had worn off. Initial severe edema of conjunctiva and lids has now given place to chronic conjunctivitis with total destruction of the mucin-secreting glands, resulting in shrinking of the conjunctiva and xerophthalmia. Corneal destruction with ulceration and bulging of the thinned cornea is the later effect which brings the patients into hospital many years after the war. M. E. Marcove.

Bursuk, G. G. **Removal of foreign bodies from the posterior corneal layers.** Sovietskii Viestnik Opht., 1935, v. 7, pt. 2, p. 154.

To prevent escape of a foreign body from the posterior corneal layers into the anterior chamber, during an attempt at removal, the author has devised a knife which is introduced into the anterior chamber and fixes the foreign body from behind. (Illustrations.)
Ray K. Daily.

Davidson, H. P. **Hardened ophthalmic lenses.** Arch. of Ophth., 1935, v. 14, Sept., pp. 484-489.

The author reviews the progress made in protective lenses and presents in detail the government specifications for hardened or "heat-treated" lenses. Laminated lenses are a more recent invention, and often protect without additional weight and thickness.
J. Hewitt Judd.

Gekker, P. I. **Ocular traumatism in metal workers in the Amur and lower Dnieper region.** Sovietskii Viestnik Opht., 1935, v. 7. pt. 1, p. 95.

Isolation of the industrial section favors the concentration of all traumatic cases in the factory hospital. Beginning in 1931 accurate data were kept on ocular traumatisms, which formed 14 to 16.5 percent of all injuries. The majority were cases of corneal foreign body. Most of the injured were between 20 and 30 years of age, some between 30 and 45, and a few over 50 years. This is explained by the greater skill of older workers and the protection of presbyopic glasses. The prophylactic work is directed towards education, individual protection, and safety devices on machines. The author is convinced that corrective spectacles are superior to goggles, and he recommends establishment of an optical department in each factory. Ray K. Daily.

Langhammerova, Rozalie. **Perforating injury of the eyeball with fragment of spectacle lens.** Ceskoslovenska Ofth., 1935, v. 2, no. 2, pp. 119-122.

Among 88,854 dispensary patients wearing glasses, only two suffered injury from breakage of the lens. Both cases had perforation of the cornea with iris prolapse. In spite of very frequent lens breakage, there is seldom injury of the eye. The author's statistics show one in 44,427 cases. Lauber reported one in 30,000.
Georgiana D. Theobald.

Melanowski, W. H. **The eye and radiant energy.** Klinika Oczna, 1935, v. 13, p. 492. (See Section 2, Therapeutics and operations.)

Natanson, D. M., Peisachovich, I. M., and Vinogorov, D. P. **The effect of arc light on the eye in electric welding.** Sovietskii Viestnik Opht., 1935, v. 7, pt. 2, p. 220.

In experimental study on rabbits, the pathologic changes depended on the distance from the light and the length of exposure. At 50 cm. an exposure of from 10 to 30-seconds produced only transitory hyperemia of the conjunctiva. An exposure of one minute produces edema of the lids and diffuse corneal opacities of several days duration. At 50 cm. an exposure beyond one minute produces permanent anatomic changes in the anterior segment of the eyeball as well as retinal lesions of an exudative and degenerative character. Repeated exposures at 50 cm. do not produce a cumulative effect or develop immunity. Reflected arc light has no effect on the eye even in exposures of one hour. Preliminary instillation of water or carodemin does not diminish

the effect of the exposure. Window glass protects the anterior segment of the eyeball, but does not prevent changes in the retina.

Ray K. Daily.

Ostroumov, V. M. **Ocular injuries in the electrical industry by particles of copper wire.** Sovietskii Viestnik Opht., 1935, v. 7, pt. 2, p. 169.

Brief reports of seven cases lead to the following conclusions: Thin copper particles are well tolerated by the cornea. Penetration into the anterior chamber or deeper leads to severe recurrent ocular irritation and loss of the eye. Copper causes development of reddish-yellow or reddish-white nodules, which may be confounded with tuberculosis or syphilis. The particles may wander through the eyeball, and may escape through the cornea spontaneously. The presence of a fine copper splinter in the anterior chamber may cause marked permanent reduction in visual acuity, without visible fundus changes. Knapp's needle is very satisfactory for removal of such particles. Vogt's skeleton-free roentgenographs are valuable diagnostically. (Illustrations.) Ray K. Daily.

Rabinovicz, M. G., and Kulieva, M. X. **Ocular injuries in children.** Sovietskii Viestnik Opht., 1935, v. 7, pt. 2, p. 188.

From detailed analysis of 194 injuries, relative to age, sex, type of injury, and final result, the conclusions are that 75 percent of such injuries (in which 21 percent of the eyes are functionally lost) are due to carelessness. They can be combated only by prophylaxis, which should consist in education of parents as to the menace from children's favorite toys and in prohibiting their sale. Ray K. Daily.

Sabata. **Iritis caused by subconjunctival bullet.** Ceskoslovenska Ofth., 1935, v. 2, no. 2, p. 122-123.

In August, 1933, a 33-year-old patient presented himself at the clinic with iritis of the right eye. In 1914 he suffered a gunshot wound of the face. His eyes were sore at that time, but vision returned to normal. The present complaint was of one-week duration. The iritis disappeared after removal of the bullet, which was under the bulbar conjunctiva, 5 mm. from the 6-o'clock position. Georgiana D. Theobald.

Tichvinskii, B. I. **Ocular protection in mountain climbing.** Sovietskii Viestnik Opht., 1935, v. 7, pt. 1, p. 107.

The eyes should be protected not only from direct sunlight but also from light reflected from sky and snow. Tinted lenses should not impair visual acuity. Most popular were smoked greenish-yellow glasses transmitting 20 percent and 6 percent of visible light. Green glasses transmitting 2 percent of visible light interfered with walking by reducing visual acuity and changing the coloring of the surroundings. Those transmitting 36 percent were too light and uncomfortable. Ray K. Daily.

Tomilova, A. F. **The effect of electric welding on the organism of the worker.** Sovietskii Viestnik Opht., 1935, v. 7, pt. 2, p. 253.

The Russian code of labor classes electric welding as a harmful occupation, assigning it the short six-hour day and ordering milk for the employees. The writer proves that the only harmful feature of the work, ocular inflammation, is wholly preventable, and that the ultraviolet rays and the ion content of the air stimulate the constitutional resistance of the workers, so that their disease incidence is the lowest in the occupational scale. Ray K. Daily.

NEWS ITEMS

Edited by Dr. H. Rommel Hildreth
640 S. Kingshighway, St. Louis

News items should reach the Editor by the twelfth of the month.

Deaths

Dr. W. Adams Frost, London, died October 25, 1935, aged 80 years.

Dr. W. N. Souter, Portsmouth, N.H., died November 24, 1935, aged 74 years.

Dr. Emmett P. North, St. Louis, died December 28, 1935, aged 57 years.

Dr. Hugo Albert Kiefer, Los Angeles, died October 26, 1935, aged 65 years.

Dr. Thomas Herbert Bell, Winnipeg, Manitoba, Canada, aged 63 years, died November 28, 1935, of cerebral embolism.

Dr. James Joseph King, New York, died November 29, 1935, aged 53 years.

Miscellaneous

The Medical School of Washington University, Saint Louis, offers a week's intensive training in ophthalmology and otolaryngology. Only qualified ophthalmologists and otolaryngologists will be accepted for this course, which begins on Monday, March 2d and terminates on the evening of Saturday, March 7th. For information address the Dean, School of Medicine, Washington University, Saint Louis, Missouri.

A week of intensive postgraduate work in ophthalmology and otolaryngology will be given in March, 1936, at Portland, Oregon, under the combined auspices of the Oregon Academy of Ophthalmology and Otolaryngology and the University of Oregon Medical School. A course in ocular pathology supervised by Dr. John E. Weeks and Dr. Frank R. Menne, Professor of Pathology of the University of Oregon Medical School will be offered. Dr. Olof Larsell, Professor of Anatomy will conduct a course in dissection of the head and neck. Lectures and operative clinics will be presented by Dr. Harry S. Gradle of Chicago, Dr. William L. Benedict of Rochester, Minnesota, Dr. William P. Wherry of Omaha, and Dr. Dean Lierle, of Iowa City. Physicians of the Northwest who are interested may obtain further information by addressing Dr. A. B. Dykman, Medical Dental Building, Portland, Oregon.

An Eye Institute, held recently in Rochester, N.Y., is the fourth which has been organized in this state by the Bureau for Prevention of Blindness of the State Department of Social Welfare, Division for the Blind. Medical Societies, Health and Social Agencies, have jointly taken part in the organization of these meetings. The purpose of these Institutes is to make available to lay workers in the field (public health nurses, social workers and teachers) a general knowledge of the eye, its normal anatomy and physiology, and its relation to the body as a whole. Programs include talks on nutrition, errors of refraction, ocular-muscle defects, and accident hazard and other topics. Pathological sources of eye conditions as related to constitutional diseases are discussed from the standpoint of prevention. In the development of this statewide educational project, enthusiastic cooperation had been received from ophthalmologists who have presented papers on selected phases of eye work, in terms readily understood by lay workers.

The first Eye Institute was held in New York City in 1931, in coöperation with the Southeastern District of Health Teachers and School Nurses. This organized group which represents thirteen counties felt the need for a broader knowledge of eye conditions in relation to their own field activities. A second Institute was held in Buffalo in 1933, at the request of the Western Zone of Health Teachers and School Nurses. Several counties in this territory were represented and a similar program was given. One hundred and ten workers from various organizations were registered. Although about three hundred workers attended the New York City Institute, it was rightly predicted that a smaller number should be expected outside of Greater New York.

In the following year, 1934, the Eye Institute was being initiated in Syracuse when the Onondaga County Medical Society and the Eye, Ear, Nose and Throat Club of Syracuse asked that the Institute be held jointly with them at the time of their annual meeting. This interest on the part of organized medicine marked a step in advance in the educational program of the state. At the evening session, Dr. Harry Gradle, who was the guest speaker for the Medical Society and the State Commission for the Blind, gave an address on the prevention of blindness.

The fourth Eye Institute which was held in Rochester, October 15th and 16th of this year, was a coöperative effort between the Monroe County Medical Society, the Monroe County Tuberculosis and Health Association, Eye Conservation Committee, and seventeen affiliated local organizations. A registration of four hundred and fifty persons manifested a recognition of the importance of this subject. The program covered the same general scope as at previous Institutes. Dr. Gradle was guest speaker for the County Medical Society. His sub-

ject was, "Prevention of Blindness." A luncheon address on "The Blind" was given by Dr. David C. Adie, Commissioner, New York State Department of Social Welfare. Dr. Adie's paper stressed the handicap of blindness and the responsibilities of society towards the blind.

At the close of each Eye Institute, Dr. William F. Snow, Director of the American Social Hygiene Association, has summarized the lectures and interpreted the significance of interrelated material. Dr. Snow stresses the value of continuity and fusion of subject matter covered by the lecturers.

The above educational program as developed in New York State is supplemented by a Course on Eye Conditions which has been offered for the past three years at New York University, sponsored by the State Commission for the Blind. The Commission has been fortunate in having the support of outstanding ophthalmologists in the development of this course. Among those who have lectured are: Dr. John Wheeler, Dr. Webb Weeks, Dr. Bernard Samuels, Dr. Conrad Berens, Dr. Robert Merriam Rogers. This course is now being held at Columbia University under a coöperative arrangement with the New York Institute for the Education of the Blind and the New York State Commission for the Blind.

On November 21, 1935, Dr. John N. Evans was appointed Ophthalmologist in Chief to the Division of Ophthalmology at the Long Island College Hospital. This institution is now requiring the certificate of the American Board of Ophthalmology as a prerequisite for advancement beyond the grade of Clinical Assistant. Drs. Milton Bergmann, Herman Weiss, Louis Freimark and David Waugh have been appointed to the Staff of the Long Island College Hospital.

Societies

On December 5, 6, and 7, 1935, the National Society for the Prevention of Blindness held its annual conference in New York City. The following facts are listed to give some idea of the extensive activities of the Society. The film "Preventing blindness and saving sight" was seen by 3100 people at 360 showings; 1113 new articles and editorials appeared, resulting from the Society's press releases; 101 sight-conservation exhibits were provided; 83 teachers were trained in sight-saving class methods during Summer Sessions; 46 cities in 23 states and three foreign countries were visited with representatives; 14 different communities were helped in incorporating prevention of blindness in their programs; thousands of workers and employers received information on sight conservation and prevention of eye accidents in industry.

The first topic, "Medical Social Work in the Prevention of Blindness," was discussed in joint session with the North Atlantic District of the American Association of Medical Social Workers and with the Committee on the Development of Medical Social Service in Eye Hospitals and Clinics of the Welfare Council, wth Miss Antoinette Cannon presiding in the morning of the first day and Dr. Ellice M. Alger, Professor of Ophthalmology, New York Postgraduate Medical School, presiding in the afternoon. Ralph G. Hurlin, Ph.D., Chairman, Committee on Statistics of the Blind, presented "Some recommended standard records for use in care of the blind and prevention of blindness." Dorothea Gilbert, Case Consultant, Social Service Department, Hospital of the University of Pennsylvania, Philadelphia, spoke on "Hospital records as a source of medical research" and Grace Cooke, Medical Social Eye Worker, St. Luke's Hospital, New York, presented "Advantage to the patient of a united participation in medical social case work." Dr. Mark J. Schoenberg, Attending Surgeon of Knapp Memorial Eye Hospital, New York, gave a paper on "Could we save more sight for glaucoma patients by continuous follow-up and care?" "Facts from seven years' experience of a social service follow-up and care of glaucoma patients" by Amy G. Smith, Chief Worker, Medical Social Service, Massachusetts Eye and Ear Infirmary, completed the discussion on glaucoma.

On the morning of the second day Lewis H. Carris, Managing Director, National Society for the Prevention of Blindness, presided, the subject being "Prevention of blindness responsibilities of official and volunteer agencies." The speakers were: Agnes K. Hanna, Director, Social Service Division, Children's Bureau, United States Department of Labor; Dr. B. Franklin Royer, Consultant, Committee on Conservation of Vision, State and Provincial Health Authorities of North America; Mrs. Mary E. Ryder, Executive Secretary, Missouri Commission for the Blind; H. R. Latimer, Executive Secretary, Pennsylvania Association for the Blind.

"The problem of fireworks accidents" was the topic for the afternoon, with Arthur Williams, President, American Museum of Safety, presiding. This meeting was in joint session with the American Museum of Safety. Louis Resnick, Director of Industrial Relations, National Society for the Prevention of Blindness, gave an address based on a report from the study of fireworks accidents in 1935 by Dr. Leland E. Cofer, Director, American Museum of Safety. The common firecracker was the chief offender in a total of 7738 accidents in this country. The funds for this study were furnished by the Pyrotechnic Industries Inc., and Mr. C. H. Fleming, Executive Secretary of this organization pointed out that the reputable fireworks manufacturers were in sympathy with the movement. He said that the industry wanted to stop making dangerous fireworks but this was useless as long as they would be replaced by far more vicious fireworks offered by unscrupulous manufacturers. In addition, he indicated the advantages of the Canadian

form the regulation which was national in extent. Dr. C. H. Watson, President, National Safety Council, urged the early care of eye injuries by ophthalmologists. John Williams Avirett, 2d, of Baltimore, President of the Maryland Society for the Prevention of Blindness, said that in Baltimore City with a population of 800,000 people there were only 12 fireworks casualties in 1931, none in 1932, 10 in 1933, 11 in 1934 and 16 in 1935. In his paper "Can we reduce fireworks' casualties through legislation?" he indicated that adequate legislation would control the number of accidents but something more than city laws was necessary. State regulation with power over the fireworks manufacturers would probably be most effective.

A "Greeting" by Helen Keller, Vice-President, National Society for the Prevention of Blindness, and "Scientific advance and welfare programs in sight saving" by Alphonse M. Schwitalla, S.J., Dean, St. Louis University School of Medicine, and "Looking forward" by Mrs. Winifred Hathaway, Associate Director, National Society for the Prevention of Blindness, completed the afternoon of December 6th.

"The influence of the Public Health Nurse in preventing blindness and conserving vision" was the final topic. This was discussed in joint session with the National Organization for Public Health Nursing, Dorothy Deming, General Director, presiding. Pearl McIver, R.N., Public Health Nursing Analyst, United States Public Health Service and Martha M. Eliot, M.D., Assistant Chief, Children's Bureau, United States Department of Labor, spoke on "The social security act as it will affect public health nursing."

"Recent advances in medicine and surgery for the prevention of blindness and the conservation and restoration of sight" was presented by Dr. LeGrand Hardy, Director of Eye Service, Fifth Avenue Hospital, New York. The conference was concluded by a discussion on "How public health nursing can carry out a program of prevention of blindness." The speakers were: Marie Swanson, R.N., Supervisor of School Nurses, The University of the State of New York, State Education Department, Albany; Amelia Grant, R.N., Director, Bureau of Public Health Nursing, New York; Gertrude H. Bowling, R.N., Executive Director, Instructive Visiting Nurse Society, Washington, D.C.

On December 19, 1935, Professor Alfred Bielschowsky presented a paper on "Functional disturbances of the eyes, including aniseikonia," at the meeting of the Brooklyn Ophthalmological Society.

The Philadelphia County Medical Society held the following program on January 2, 1936: Dr. Samuel Phillips, Case of blindness following toxemia and nephritis of pregnancy; Dr. Mortimer W. Blair, Traumatic iridodialysis, presentation of two cases, one with nonsurgical reattachment; Dr. Frank A. Murphy, Disappearance of cataractous lens following an attack of iritis; Dr. Charles W. Lefever, Retinitis pigmentosa with special reference to sympathectomy as a means of treatment.

The next meeting of the Southern Medical Association will be held in Baltimore. At the recent St. Louis meeting the following men were elected to office for the year 1936: President, Dr. Fred M. Hodges, Richmond, Va.; First Vice-President, Dr. Quitman U. Newell, St. Louis; Chairman of the section Ophthalmology and Otolaryngology, Dr. Millard F. Arbuckle, St. Louis; Vice-Chairman, Dr. Grady E. Clay, Atlanta, Ga.; Secretary, Dr. Oscar M. Marchman, Dallas, Texas.

Personals

Having reached the age limit, Professor Emil de Grosz is retiring from the First Ophthalmologic Clinic of Budapest, after thirty years of service. The occasion has been celebrated in a jubilee volume, prepared by his former students. Since its foundation, the Budapest Clinic has treated over 659,000 patients. Professor de Grosz also retired recently from the presidency of the International League for the Control of Trachoma, a position which he had occupied for five years. An appreciation of his work as a clinician and teacher, written by Professor Maggiore of Genoa, appears in Annali di Ottalmologia for September, 1935. Professor de Grosz is well known in America, where he was guest of several national societies in 1933.

The Dutch Government recently issued a commemorative postage stamp in honor of Franz Cornelius Donders, and bearing his portrait.

Dr. Jaroslaz Kubik has been given the permanent appointment as head of the eye clinic of the German University in Prag, succeeding Dr. Anton Elschnig who retired on account of the age limit two years ago.

The October issue of the Klinische Monatsblätter für Augenheilkunde contains an obituary notice of Hermann Wilbrand of Hamburg, who died last September at the age of 84 years, after being bed ridden for several years by a number of apoplectic seizures. (For the last two years he was without the power of speech.) Wilbrand's painstaking investigations as to the visual tracts and centers are well known. After the World War he had the satisfaction of saying that the experiences of this war in injuries to the optic centers supported the earlier conclusions of himself and Henschen (who had devoted himself particularly to histologic study of the brain) that the retina was projected on the surface of the cerebral cortex around the calcarine fissure. Henschen, who writes the obituary notice, says that although Saenger signed as collaborator on the monumental "Neurology of the eye," this latter author did not actually contribute a single sentence to Wilbrand's seven volumes.